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24 September 1984

East Europe Report

SCIENCE & TECHNOLOGY

FBIS FOREIGN BROADCAST INFORMATION SERVICE

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SCIENCE & TECHNOLOGY

CONTENTS

CZECHOSLOVAKIA

PIEZOELECTRIC SENSORS IN SPITE OF EMBARGO CLAIMED

Prague TECHNICKY TYDENIK in Czech 31 Jul 84 p 3

[Article by Oldrich Smejkal: "From Prototypes to Serial Production--Piezoelectric Sensors Despite Embargo--Carbon Dioxide Lasers for Tesla Holesovice--Temperature Measured From 2 m Distance"]

[Text] We met the head of the Development Center of the CSAV [Czechoslovak Academy of Sciences] Development in Prague, Eng Jan Zemlicka, at a seminar on that center. During a break, while viewing a small exposition with 20 interesting exhibits of developmental types and systems designed for societal use, we were informed in detail about the concept, program and orientation of the center.

The Development Center of the CSAV Physical Institute came into being in autumn of last year, because the introduction of scientific findings into practice is still very time consuming. While finished results of basic research were turned over to production enterprises as expediently as possible, if they showed any interest in them, of course, the subsequent stages, development, preproduction and production took in enterprises so long that what was advanced and new became hopelessly obsolete in those 5 to 7 years.

The key mission of the Development Center is to accelerate the transfer of scientific and promising advanced results from mathematical and physical sciences into technological and societal practice. The center is a resolute response of CSAV Physical Institute personnel to the resolutions of the 16th CPCZ Congress and the Eighth Plenum of the CPCZ Central Committee. They intend to achieve the fastest possible application in practice of scientific findings that often were only published in the past or took a very long time to find acceptance.

While in its initial stages for the time being--construction of a building on the institute's premises is being completed and the number of scientists is still below requirement--the center is already applying selected results of basic research and of research done by institutions of higher learning. It is also bringing to life research findings that originated elsewhere but failed to find producers. The center endeavors to accomplish accelerated processing of documentation and to produce zero prototypes suitable for serial production.

The center's efforts are greatly aided by the agreement signed by the School of Mathematic and Physics of Charles University and the CSAV Physical Institute. A joint workshop has already been established in the school's developmental workshops that for the time being is turning out functional parts of the prototypes exhibited at the exposition.

The Development Center is divided into three departments. One of them is the Department of Microprocessor Technology and Unique Systems. Its key objective is the development of the microprocessor systems and devices that can be applied in many control systems. One of them is to analyze acoustic emissions of structural units under load exposure, as in nuclear power plants or in heavy chemistry operations where operational pressures are extraordinarily high. Piezoelectric sensors located at 32 points can diagnose precritical states, e.g., in pipelines. The use of these systems can preclude a potential breakdown. It warns the operating personnel ahead of time that certain parts of the pipeline will have to be put out of operation. A similar foreign product would cost tens of thousands of dollars and, moreover, it is under embargo. The Department of Microprocessor Technology will naturally continue to participate with one-third of its production capacity in the Interkosmos program.

The center's second department is to innovate and develop carbon dioxide lasers and develop other designs of more efficient lasers. An agreement regarding scientific production association between the CSAV Physical Institute and Tesla Holesovice--about the center's continued transfer of verified prototypes of carbon dioxide lasers and documentation for their serial production--is at the present time awaiting final signature. This department will also deal with infrared optics, mainly gallium arsenide, as it is absolutely indispensable for high-performance lasers. This technology is very expensive abroad; a single optical member costs DM 1,000.

The task of the third department is the development of physical instruments. Here the results of the basic research done by the Physical Institute, specifically in research of pyroelectric materials, find direct application. These elements, which hold an extraordinary promise for the future, will find application in many unique instruments, e.g., in contactless measurement of temperature--measurements done at a distance of 1 m to 2 m. In this manner it is possible to measure the temperature of resin during continuous casting into rotors of electric motors and control the correct temperature of resin by feedback. A contactless sensor can determine the temperature of tire tread on rollers, the temperature of wheel bearings of rolling stock, etc. An analogous principle can be used in control systems controlling the passage of motor vehicles at intersections, entry of unwanted personnel into rooms and spaces, etc.

Great interest in the RG-T-18 type infrared detector, which is suited for measuring laser performance, was shown by the leading Soviet scientist, Academician Prokhorov.

The Development Center is to keep developing in the near future these three areas of activity, including optics. It is envisioned to develop in the near

future a system that could be added to any vacuum device. Such a system is intended for molecular epitaxy technology, i.e., technology for the preparation of highly integrated circuits usable in microelectronics. Such a system can be procured abroad at a cost of Kcs 10 million in foreign exchange.

PHOTO CAPTIONS

1. The products of the Development Center of the CSAV Physical Institute include the RG-T-18 pyroelectric radiation detector and the 01 contactless temperature measuring sensor. This set of instruments is suitable for measurements in the field of spectroscopy, radiometry and analysis of laser pulses. It can find application in industry for contactless measuring of temperature from 0 to 100°C.

2. AS-T-21 type warning system for interior spaces. It reliably registers the movement of persons by intercepting infrared radiation corresponding to their body temperature in contrast with the background. The device can also be attached to the ceiling of a room. Viewing angle 26°, range of ambient temperature 0-40°C, weight 0.36 kg, dimensions 74x110 mm, pyroelectric Al/Ge sensor, power feed 16 to 30 V/30 mA.

3. On-board control computer for the Interkosmos program produced by the Development Center of the CSAV Physical Institute.

4. Control system for ground control centers (Interkosmos program) used also in the VEGA project.

5. Two variants of a pyroelectric temperature sensor design authored by artist-painter Vaclav Kasik. The device serves for contactless detection of temperature (measuring range 0 to 400°C) with potential control by feedback and its recording. The sensor comes equipped with a switch for measuring ranges, the degree of emissivity and reset to zero. Power feed 220 V.

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CSO: 2402/12

NEW EQUIPMENT AT 1984 LEIPZIG SPRING FAIR

Communications Equipment

East Berlin DIE WIRTSCHAFT in German 1984 Leipzig Spring Fair Issue, pp 14-16

[Text] Office Efficiency

This display shows that efficient work methods and fast decision making are inconceivable without modern communication facilities. The combination of RFT [radio and telecommunications technology] communication and computer hardware from the Robotron Combine VEB is being exhibited with some typical application examples.

The complex also naturally includes the electronic F 1100 printer transceiver, the F 1200 printer receiver and the FKG 1001 error corrector. The new Apart 2001 telephone equipment family and the "Antique" for those who love certain old-time styles round out the exhibit.

Modern communication Facilities for Public Services

This display shows how widely spread the palette of modern communication equipment must be to be able to meet the diverse requirements for communication at all levels.

Extending communication to remote areas, not yet or little developed economically, is offered by RFT rural telephony already proven in many countries. On display are the UHF/VHF radio telephony system and the accompanying communication equipment, including the PCM 10-400/800 digital directional radio and especially the OZ 100 D universally tunable digital switching unit (photo at center left) [not reproduced]).

Wireless communication equipment is represented by the KSS 130 shortwave transmitting system. RFT shortwave transmitters and receivers have been proven internationally numerous times in setting up national, continental and worldwide communication networks. A new product is the KFC 1300 radio container. This versatile mobile 1-kW shortwave transceiver offers problem-free, fast set up of radio operation, e.g. in disaster areas, and rapid change of station location.

Digital communication switches and hardware are represented by, among others, examples of the OZ 100 D digital local exchange, PCM 120 communication system equipment and the DUeS-LL 8 lightwave communication system. A metering system for lightwave communication hardware rounds out the interesting exhibit at this complex (photo at center right [not reproduced]).

This complex has been expanded by exhibits of sound studio equipment, from the high-quality wireless stage microphone to the loudspeakers. The MP 4084 RFT sound studio mixing console is also included (photo below [not reproduced]).

Automation and Test Equipment with High Standard

Especially interesting in this complex:
The ZFK 1020 line TV camera is the basic component in the modular RFT image recognition system for automation equipment, particularly for working together with industrial robots. Used as the radiation receiver for image and character recognition are sensor lines, which can pick up optical information under industrial conditions too. Application examples for the ZFK are measuring metallic work pieces, size recognition of surfaces, counting of objects and localization of flaws.

Test equipment which has "learned to think" is represented by the PAGE computer-aided test and analysis system. The autonomous controller of this system, intended for communication switch equipment, is a universal control and analysis computer (USAR), which in conjunction with peripherals handles tests and logs results. An extensive package of service and auxiliary programs is available.

RFT Communication Electronics for Numerous Applications in Worldwide Communication

The world communication year 1983 drew renewed attention to the need of world communication as an absolute necessity for the technical, economic and social progress of mankind. Communication managers and industries were reminded of their responsibility of supporting and promoting worldwide communication with their devices and capabilities.

The Communication Electronics Combine VEB which unites the GDR communication hardware industry research, development and manufacturing potential, which has been growing dynamically in recent decades, has been focusing on this task with its force of 38,000 scientists, engineers, technicians and specialists. It offers modern electronic devices, equipment and systems for numerous applications in enterprise, territorial, national and worldwide communication to postal and telecommunication management and communication equipment buyers in the economy and industry, transportation and municipal institutions. Their high efficiency, reliability and use are ensured by integrated and peripheral microelectronics. A swift innovation process is typical for the extensive variety of RFT communication electronics. The scientific and technical progress, which finds its most compelling expression in the increasing digitalization of products and in photo conductor communication transmission, is the result of accelerated application of microelectronics, particularly hybrid microelectronics, and microcomputer technology.

In the area of telephones, the manufacturing array of the Communication Electronics Combine VEB includes, among others, telephone apparatus in the most varied models for pulse and MFC [not further identified] push-button dialing, receptionist and management office equipment, private branch exchanges, as well as analog, analog-digital and digital telephone switching systems. Electronic teleprinters are available with any type font desired for exchange of printed information to relieve and expand enterprise telephone network intercom devices for building small and large systems. The different requirements of message communication are being met in the variety of RFT communication electronics, among others, with carrier frequency systems for forming and resolving channel groups between 12 and 2,700 channels, the SZT time-shared telegraph and data communication equipment, digital directional radio communication equipment, PCM [pulse code modulation] equipment for digital communication over NF [low-frequency] lines, photo conductors and directional radio channels as well as a photo conductor communication transmission system.

Among the commercial and UKW [ultra shortwave] radio equipment are the shortwave communication transmitter, receiver and transceiver units, including the KSS 1300 microprocessor-controlled shortwave transmitter system as well as the U 700 UKW system for mobile and stationary use.

Other exhibits include products of electro-acoustics, studio hardware, television applications and measuring and test equipment for communication equipment.

Based on this broad product program, special communication systems were developed by the Communication Electronics Combine VEB for modern requirements. Deserving mention here are the RFT rural telephone system, which promotes opening up rural areas still poorly developed in infrastructure and the economy and supports the UIT [not further identified] goals of expanding the world communication network. The UHF/VHF radio telephone system is the key to this.

To increase efficiency in the economy, industry and transportation by making information available rapidly and widely and conveying it, communication systems such as the UKW railroad radio system, the track dispatcher telephone equipment, the ZBWL central enterprise intercom, the SGS 15 voice equipment set or the general voice position system were developed.

Goal-oriented research and development by the scientists and engineers of the Communication Electronic Combine VEB ensures continually new technical solutions and thereby rapid change in RFT communication electronics generations. This takes place in close cooperation with other research centers in GDR industry, with GDR higher and technical schools and with scientific institutes in the socialist countries. In the process, scientific and technical cooperation with the USSR is especially close and successful. The latest evidence of this is the ENSAD standard communication system for analog and digital switching.

RFT Communication Electronics -- Successful Use in More Than 30 Countries

The GDR communication equipment industry can point to major contributions in furthering world communication: Communication systems and networks have been built, expanded or modernized with RFT communication electronics in more than 30 countries in Europe, Asia, Africa and Latin America. Many millions of telephone calls are switched and handled daily in the world with RFT telephone equipment. Hundreds of thousands of messages are typed on RFT teleprinters and innumerable national, international and intercontinental radio communications are generated rapidly and reliably with RFT shortwave transmitters and receivers. Business operations in the economy, industry and transportation in many countries are managed, coordinated and supervised with RFT communication systems. The performance of the GDR communication equipment industry in expanding the world communication network has gained international recognition and esteem and has ensured it a place among the leading world exporters in high performance communication equipment.

RFT communication electronic products have been used successfully on a particularly large scale in expanding and improving communication systems in the CEMA countries, especially the rural communication network in the USSR. Thus, e.g. the Soviet Post and Telecommunications Agency has received telephone switching equipment with almost five million call units, low and high channel communication equipment for hundreds of thousands of kilometers of voice circuits, several million telephones and far more than 100,000 teleprinters. A sizeable contribution was also made by the GDR communication equipment industry to expand the telephone, telegraph and radio network of the Republic of Cuba. Just in the last decade, more than 200 telephone exchanges were opened with RFT switching equipment. Under a program to further develop and modernize the Cuban communication network, a self-dial telephone network is now being set up for the entire island republic and international calls. The communication electronic combine is implementing it based on a long-term agreement.

With comprehensive work and equipment, the GDR communication equipment industry is supporting the establishment of communication in the developing countries in Africa, Asia and Latin America. Of special importance here are engineering solutions which are not just economical and oriented to the future, but also enable a phased expansion corresponding to the progressive economic development of the country.

Some recent examples of cooperation in communication equipment development for new African and Arab national states are the establishment of radio networks in the People's Republic of Angola and in Ethiopia, a UKW [ultra shortwave] radio network covering 24,000 square kilometers and a radio bridge with telephony and radio teleprinter channels in the People's Republic of Mozambique, a Telex network in the People's Republic of the Congo, a wireless domestic telephony network in the Republic of Zambia and, the largest project, the development of a domestic telephone network in the People's Democratic Republic of Yemen. This network includes telephone switching exchanges, local cable networks, directional radio links and shortwave radio stations, in which shortwave automatic transmitters in conjunction with shortwave traffic receivers and transfer equipment, including complete power supplies, and diesel engines

have been installed. These shortwave links allow direct telephone capabilities for the capital of Aden and in other provinces.

For several years, the Communication Electronic Combine VEB has also been a partner in expanding Mexican communications. To provide telephone service in rural regions, proven coordinate switch type series ATZ automatic telephone exchanges were supplied. For the largest and most modern radio transmitter in Latin America in Nopaltepec, 16 automatic shortwave transmitters, an antenna system consisting of 22 antennas, monitor and supervisory console and power supplies were delivered. Also supplied was a UHF/VHF radio telephony group for the domestic telephony pilot project.

Last, but not least, among the numerous examples for support of large investment plans by postal and telecommunication agencies is the telephone and teleprinter network of the Hellenic Telecommunication S. a. (OTE) in Greece.

RFT Communication Electronics: Partner for Complex Capabilities, Licenses, Know-How

The abundant experience of the Communication Electronic Combine VEB is also manifested in the implementation of communication equipment investment plans and last, but not least, in a comprehensive supply of scientific and technical results and other non-material accomplishments.

Along with communication equipment optimally suited to the application, economically advantageous and oriented to the future, the Communication Electronic Combine VEB offers its partners all the performance capability required for the installation of this technology. For the customers, this means the combined solution to communication and information problems. The Berlin Radio and Telecommunication Equipment Manufacturing VEB acts as general supplier, general designer and general contractor for the combine.

This RFT enterprise with many years of experience in manufacturing equipment ensures the comprehensiveness of performance desired through proven specialists and close cooperative relations with combines and enterprises in other GDR industrial sectors.

Capabilities include consultation ranging from discussion of the problem to suggestion of a solution, drafting a proposal, including calculation and scheduling, preparation of network studies and studies on long-term development of communication networks, design, delivery, construction supervision, assembly, installation, maintenance and customer service. This includes preparation and coordination of cooperating production groups, all construction and related activities required to implement the plan, and instruction and training of operating and maintenance personnel. This also includes setting up training, repair and service shops, test laboratories and complete manufacturing shops for communication products.

In exporting systems, the general contractor strives to draw broadly on the scientific, technical and economic potential available to the customer in the performance of the tasks. Thus, for example, Mexico's new Nopaltepec radio

transmitting station was built on the basis of a RFT project in close cooperation with native technical manpower.

Mexican engineers also participated in the design efforts for the wireless rural telephone network in Guerrero, including the necessary radio field measurements, and in the assembly of UHF/VHF radio telephone network groups. At the same time, Mexican specialists received theoretical and practical training for maintenance and operational service of the equipment.

Another example of scientific and technical cooperation is the expansion of the Cuban domestic communication network. Engineers and installers from the RFT equipment manufacturers have been working closely together for two decades with the Cuban customer, the Ministry of Communications, in planning, design, assembly and installation of communication equipment. Cuban technicians were trained both in the GDR and in their country on the assembly, operation and maintenance of RFT communication electronics.

Scientific, technical and other non-material capabilities offered by the Communication Electronics Combine VEB range from licensing of communication products and technological developments, providing know-how and support for systems introduction through consulting and engineering, education and training, scientific and technical cooperation, providing software packages, for example, for scientific and technical computations, circuit design and others, to setting up of pilot projects and experimental systems for scientific and technical purposes, and developing and providing specific research technology.

Apart 2001: Basis of New Family of Telephone Apparatus

This telephone apparatus is opening a new generation of electronic products for wire communication. It is the basis of a telephone family with pulse dialing and small dimensions.

It consists of a receiver and a key-pad unit for pulse or multi-frequency dialing. The circuitry consists of a transformerless electronic voice-path circuit with an integrated audio amplifier. A potentiometer can be used to vary receiver volume. The required transmission level is produced by an integrated amplifier in the piezo microphone. High quality audio converters reproduce highly clear and natural-like voice. The input circuit design allows simple conversion of the apparatus for connection to shared switches.

The apparatus uses a conventional ring system. From the incoming ring voltage, an electronic circuit produces a voice frequency signal which is reflected by a piezo-ceramic signal generator. Components included according to function are coupled to each other by flexible wires and flat connectors which enables easy installation and service.

KFC 1300 Radio Container: A Mobile 1-kW Shortwave Transmitting and Receiving System

This multi-purpose mobile 1-kW shortwave transmitter and receiver is housed in a Koepenick vehicle case made by the Halle Vehicle Assembly VEB (dimensions

are 4260 x 2440 x 2000 mm without frame antenna). This holds down the cost and time for setting up a shortwave transceiving system for radio operation. System mobility allows rapid change of location of the radio container.

Main components include the KSS 1300 1-kW transmitter system. With a suitable antenna, the system can be used reliably for intercontinental and local communication.

Data Security and Error Correction Unit for Teleprinter Traffic over Shortwave Radio Channels

The KPI series data protector and corrector protects teleprinter information sent over shortwave radio links against unauthorized monitoring and also provides self-correction of transmission errors. The integrated selective call system enables up to 120 single calls, 7 group calls and 1 conference call. The units can operate in the simplex or duplex mode. They are included directly in the communication path on the send and receive sides and thus eliminate all cost and time for operator encoding/decoding of information being communicated.

The KPI series units can also be used for operation over dedicated lines. They are not intended for use on public Telex networks.

ZFK 1020 Line Television Camera with Many Possibilities for Process Automation

The ZFK 1020 line TV camera is the basis for a modular RFT image recognition system for process automation, especially with industrial robots. The beam receiver for image and character recognition is a row of charge-coupled device [CCD] sensors which can also pick up optical information under industrial conditions, convert it to electrical signals and store it briefly. Application examples are measuring of work pieces, size recognition of surfaces, counting of objects and localization of faults.

PAGE Computer-Aided Test and Analysis System with Utilities

Manufacture, assembly, installation and maintenance of communication switching systems require numerous and various types of tests which can be performed reliable and efficiently with the PAGE computer-aided test and analysis system. The autonomous controller of this system is a universal control and analysis computer (USAR), which in conjunction with peripherals connected according to the specific task handles tests and logs results. An extensive package of utilities is available to the user.

FLE 1010 Television Reader for People with Extreme Vision Impairments

The FLE 1010 television reader is used to help people with extreme vision impairments to read. A book, newspaper, magazine, letter or other material to be read is scanned by a TV camera and greatly enlarged as a TV image. TV optoelectronic capabilities allow this image to be widely adapted in numerous ways to the user's vision capacity.

G 1000 Pocket Receiver

The pocket receiver is a single-chip radio. It has a ferrite antenna and receives stations in the middle waveband from 520 to 1605 kHz. Above-average sensitivity and selectivity are achieved by use of modern components. Good reception is ensured in unfavorable locations as well. High value of the pocket receiver is ensured by the small dimensions (69 x 155 x 27 mm), light weight of only 209 g, including batteries, the capability of single dial operation of volume and station selection and earphone.

The radio has a 150 mW speaker. It consists of two half cases provided with a snaplock.

BU 01 Electronic Exposure Timer

The BU 01 electronic exposure timer for use in photo laboratories allows connection of all commercial enlargers up to 1,000 watts. The desired exposure time is set by using a 12-step rotating switch between 0.1 seconds and 8.1 minutes. Steps available are 1, 1.2, 1.5, 1.6, 2.2, 3.2, 3.8, 4.6, 5.6, 6.7 and 8.1. The range switch allows selecting four ranges x 0.1, x 1, x 10 seconds and x 1 minute; thus, 48 exposure times are selectable. Electronic components ensure high precision and reliability.

Exposure time course is indicated by a LED. It resets after elapse of half the time. A stop button allows performing other work during the exposure time. Thus, repeated interruption of the exposure process is possible.

Electronic Control Devices

East Berlin DIE WIRTSCHAFT in German 1984 Leipzig Spring Fair Issue, p 24

[Text] At the 1984 Leipzig Spring Fair, the Berlin-Treptow Friedrich Ebert Electrical Equipment Plant VEB can look back to 30 years of successful development. In the combine with its 23 enterprises and a research center, 32,000 workers and employees develop and produce for international power and MSR equipment manufacturers

--microelectronic components, devices and control equipment of MSR [not further identified] technology

--devices for analysis, process, operating and recording equipment,

--mechanical, electromechanical and pneumatic components for system and robot controllers,

--power switches, selectively and current limiting, vacuum and air protectors, motor protector, failing current protector and cam switches in the low voltage range,

--power electronic products,

--technological special and efficiency equipment, and

--high value consumer goods.

The combine also grants device, manufacturing and patent licenses according to requirements of licensees.

KFI Failing Current Protection Switch

The highly sensitive KFI switches meet the new regulations of VDE [Association of German Electrical Engineers] 0 664 and CEE [not further identified] publication 27, whereby disconnection is required not just during purely sinusoidal failing currents, but also during single pulse failing DC with or without phase sectioning and with or without superimposition by small pure DC failing currents (6 mA maximum). With that, they take into account the increased use of industrial and household devices with electronic components and the possibility of failing currents with DC portions.

Ursadat 5000 Microprocessor

The Ursadat 5000 enables implementing computer units installed decentrally and, together with the unit interface, building hierarchical process computer systems. The modular Ursadat 5000 microprocessor is designed as equipment specific to an applications and is suitable for
--monitoring, control, regulation and optimization of industrial processes,
--regulation of energy generating and distributing processes,
--control of traffic and transportation systems, and
--medical equipment and laboratory automation.

Ursamar 5010 Process Controller with A5120 Programmer

With this combination from the Ursatron 5000 system, the producing plant in the KEAW [Electrical Apparatus Plant Combine] meets the goal of solving automation tasks in regulation, primary data processing and control technology with high linkability and great processing depth in the shortest possible time by maximum software support.

The device combination of the freely programmable Ursamar 5010 microcomputer controller and the A5120 programmer can be expanded with a color display and the SD 1152 serial printer.

The combine's capabilities include:
--cost-effective hardware and software solutions for automation tasks in control and regulation equipment based on the Ursamar 5010 process controller,
--delivery of the Ursamar 5010 process controller and A5120 programmer in programmed form,
--development of applications software for process-oriented devices and
--implementation of KEAW problem-oriented software packages on the customer's floppy disk development devices.

ISO 1000 Insulation Meter

Development of the ISO 1000 electronic insulation meter marks the start of a completely new generation in service meters which evolved from the UNI 110 electronic multimeter and the UNI 21 multimeter already proven internationally. The ISO 1000 insulation meter is used to measure and check insulation resistances of electrical equipment and electrical and electronic devices; the advantage of operation independently of utility power is a special feature.

The ISO 1000 is especially suited to locating faults in the insulation of the object being tested. In addition to its main applications, DC and AC voltage can be measured.

2 TZ Single-Range and Single-Function Time Relay

The 6 TZ electronic multirange time relay series, already proven, has been expanded by the 2 TZ 11 w and 2 TZ 21 w electronic single-range and single-function time relays. They are hard-programmed on/off switch delayed time relays for DC and AC voltage applications. The new type series covers six delay time ranges from 0.1 to 10 h which allows many applications in industrial controllers.

PHOTO CAPTION

1. p 24 Ursamar 5010 process controller.

Microcomputer-Aided Design

East Berlin DIE WIRTSCHAFT in German 1984 Leipzig Spring Fair Issue, p 31

[Text] To solve problems in design, projection, manufacturing technology and other activities in preparing for production, products have to be developed rapidly according to the market situation and specific customer requirements. Attractive marketable products have to be developed in a short time based on existing solutions in combination with new elements needed.

The Robotron Combine VEB is exhibiting hardware and applications solutions for that at the 1984 Leipzig Spring Fair for the first time. Various workstations for design, projection and manufacturing technology were developed in close cooperation with enterprises and development centers in machine building, electrical equipment, electronics, equipment manufacturing and other partners in industry and research.

Robotron A 6454 Workstation for Design and Manufacturing

The A 6454 AKT [CAD/CAM workstation] is a CAD/CAM system which enables a decisive increase in productivity by switching from manual to computer-aided processing of tasks in engineering preparation of production.

It is an applications-oriented, modular system consisting of the A 6402 basic computer, a configuration with the Robotron K 1630 microcomputer and standard peripherals, and graphics peripherals with raster video display, high-resolution digitizer and plotter.

Workstation configuration can be expanded with no change to the applications software by available basic graphics software such as
--the GKS 1600 graphics core system,

--DIG 1600 basic graphics digitizing software, and the
--GBS 1600 basic geometrics software for geometric object description and manipulation. With 256K bytes of RAM in the Robotron K 1630 microcomputer, a maximum of 4 display and/or digitizing workstations can be operated, with a maximum of 2 users working at the same time with the graphics core system.

An A 6454 AKT application is controlling the design, manufacturing preparation and manufacturing processes for double curved surfaces, e.g. for these products:
--propeller and turbine blades
--ship and boat hulls
--shoe soles and lasts
--consumer goods with sculptured shapes such as watches, metal works, irons and containers
--toys
--armatures
--surface shells in construction and architecture
--prostheses in public health.

The Weissenfels Central Research and Rationalization Enterprise VEB of the Shoe Combine, e.g., developed an applications solution for the A 6454 AKT for computer-aided manufacturing preparation using numeric-controlled [NC] machines in shoe-specific shapes and tool building and for sewing automation with NC sewing machines.

By another applications solution, manual phases in the path from the idea of the shape or design to the finished tool can be eliminated in the design process for automobile bodies by using the A 6454 AKT.

Robotron A 5510 Drawing Board Oriented Design Work Station

The Robotron A 5510 is aimed at supporting the design process in the broadest sense in the drawing, shaping and dimensioning phase and in generating documentation.

The main effects are drawing is facilitated and the capability of performing dimensional computations at the CAD station is provided. Accompanying software supports digitizing and drawing based on the Robotron A5120 or A 5130 office computers; these functions can be implemented:
--digitizing functions
--insertion of graphics already available on machine readable media into the drawing being digitized
--structuring during digitizing, definition of digitized data as drawing elements and inclusion into graphic structures
--input capability of a structured drawing from machine readable media for purpose of changing it
--manipulation of stored graphic structures
--storage of graphic structures as macros
--alternative output of digitized drawings on machine readable media (diskette)

--preparation of digitized graphic information for graphic output by the SD 1157/269
--direct digitizing while drawing by linking the digitizer to a plotter.

Robotron A5601 Precision Digitizer

The Robotron A5601 precision digitizer is a standalone device without a higher computer and is used to digitize geometric representations. It is based on the modular K1520 microcomputer system with standard peripherals and digitizing table.

The special software solution enables processing of any scale and rotation of coordinate systems. The free programmability of the computer and the modular design of the software offers a solution, e.g., to these tasks:
--PCB design: simple conversion from PCB image designs into control tapes for photo composition and processing machines
--clothing industry: optimization of cutting for automatic production processes
--transportation: optimization of transport for acquisition of road networks
--design: conversion of wire networks, pipe networks, building representations, furnishing plans, foundation plans, etc. for optimization and processing
--medical technology: digitization of represented courses of motion and acquisition of graphic diagrams
--cartographic geodesy: updating of maps.

Robotron A5130 Process Engineer Workstation

A version of the Robotron A5130 office computer is used with a perforated tape unit as a workstation for special manufacturing process activities such as acquisition, preprocessing, and changing of primary data, programming of NC tools (NC tool programming in interactive mode and acquisition and change of workstation master cards).

Device modularity allows designing various workstations to match the processing environment.

PHOTO CAPTIONS

1. p 31 Robotron A 6454 CAD/CAM workstation.

2. p 31 Robotron A 5510 drawing board oriented design work station.

3. p 31 Robotron A 5601 precision digitizer.

4. p 31 Robotron A 5130 process engineer workstation.

Pentacon X-ray Film Developer

East Berlin BERLINER ZEITUNG in German 3 Apr 84 p 1

[Text] The Berlin Pentacon Equipment Plant VEB collective wants to fulfill the annual plan by 34.7 percent by the elections on 6 May. Four months ahead of plan, a new automatic X-ray film developer for use in medical institutions is now in series production in the enterprise.

The new AR 510 automatic machine, recipient of a gold medal at this year's Leipzig Spring Fair, represents an outstanding international standard. With enhanced intrinsic value, it was able to replace three devices used in the past. Compared to previous models, it is considerably lighter, especially with less steel and plastic. Through microelectronic controls, energy consumption has been halved. The Friedrichshagen enterprise wants to produce about 200 Pentacon AR 510s for the national economy and export in 1984.

The new device features the capability of unattended operation round the clock; 50 X-rays can be processed per hour. Depending on operating mode, a finished photograph is available to a physician for diagnosis after 2.5 or 4.5 minutes.

As major reasons for the successful product development, Werner Lange, the project director, named the consistent comparison to the world state of the art and the close cooperation with future users, for example with the Berlin Charite and the Leipzig Karl Marx University. "Accurate analyses of the work process in the X-ray departments gave us information on required film development times and bath sizes among other things. Thus, we were able to make a device that excels by an optimal price/performance ratio." Through further technological updating, the development and supervisory collective has begun smooth series manufacture of the AR 510.

8545
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MICROELECTRONICS EXHIBITS AT 1984 LEIPZIG SPRING FAIR

Munich COMPUTERWOCHE in German 6 April 1984 pp 44-45

/Article by Klaus Krakat, Berlin correspondent for COMPUTERWOCHE/

/Text/ At this year's Leipzig Spring Fair, "Applied Microelectronics" constituted the central topic of a joint exhibition of GDR combines in the industrial area of electrical engineering/electronics. This was primarily intended to demonstrate that in the GDR, too, the influence of microelectronics has smeared out the previous boundaries between individual industrial branches. With the other exhibiting CEMA countries, the exhibition spectrum ranged from electronic components to industrial robots.

Under the slogan "Applied Microelectronics in the GDR", the exhibits in Hall 15 of the fair grounds emphasized the current developmental status of microelectronics and its possible applications. This complex of exhibits was organized in six topic areas.

The topic area "Efficiency in the Office" comprised not only video terminals with remote data transmission, office computers, text processing systems, and electronic typewriters from the Robotron Combine in Dresden, but also telex units, digital transmission systems, and telephone installations from the Communications Electronic Combine in Leipzig were shown. Finally, a novel voice input system was shown here, which was developed jointly by Robotron and Dresden Technical University, on the basis of the 8-bit CPU U 880 (from the Microelectronics Combine in Erfurt).

The topic area "Public Agencies - Modern Communication Technology" was intended to elucidate the current capabilities of communications technology developed in the GDR. What was shown was a digital transmission central as well as a light wave guide transmission system from the Communications Electronics Combine in Leipzig. Most of the systems and devices presented here were developed on the basis of electronic components from the GDR, including the CPU 8880. In general, the exhibits shown here gave the impression that "new media", such as Btx or video text cannot yet be expected. Undoubtedly, however, the activities of combines that are active in the telecommunication sector are aimed in the long term towards implementing some of

the services and technologies that are already being practiced here in the West and that seem to promise success.

CAD/CAM Moves Ahead

The center point of the topic area "Efficient Production" was the first time occupied by CAD/CAM systems developed in the GDR by Robotron on the basis of microcomputers. As a contribution in the area of interactive CAD/CAM systems, the work station for design and technology with graphic basic software was shown. Its main application areas are the computer-supported production of drawings, the planning of machines and systems, the programming of numerically controlled machine tools, as well as the calculation of individual parts. Furthermore, a CAD/CAM system for rotation-symmetric parts was shown.

Since the beginning of the eighties, Robotron has delivered about 43,000 microcomputers. All these are based on microprocessors from the Microelectronics Combine at Erfurt. According to information available at the Fair, the picture-processing system Robotron A 6472, which was likewise exhibited by Robotron, as well as the data and information system Robotron A 6422 are both used for improving efficiency in specific ways. It is said that these systems permit the entry, processing, and output of data over a large number of terminals, either manually via a keyboard or semi-automatically via a digital I/O interface.

Examples of the application of microelectronics in the GDR were represented by exhibits within the topic area of "Medicine and Laboratory Technology in the Service of Health". The Combines Communications Electronics Leipzig, Robotron Dresden, and Carl Zeiss Jena presented these exhibits. The main portion of these innovations, for example devices for cardiac circulation diagnosis as well as x-ray diagnosis and therapy, are based on the component system U 880, from the Combine Microelectronics Erfurt.

First Personal Computer in the GDR

The most conspicuous innovations of the GDR electronics industry included in particular personal computers as well as the new microcomputer systems, new hand calculators, and a new chess computer. The Z 9001 personal computer, developed by the Robotron Combine, was constantly closely surrounded by electronic fans from the GDR. According to Robotron's data, this involves a "compact unit equipped with a typewriter keyboard". The Z 9001 consists of the following functional groups: the computer circuit board, on which the 8-bit CPU U 880 D is housed together with a memory and input and output interfaces, the keyboard, and the power supply.

It is said that the Z 9001 can be connected to any commercial television set as well as to a standard cassette recorder. It can be used not only for computer games but also for teaching purposes in schools and universities, as well as to perform scientific-technical calculations. As the "Saxony Journal", the organ of the SED Regional Managment in Dresden, recently reported, this computer is to be understood as a "contribution to consumer goods production". Already this year, 500 units are to be made available for popular consumption.

A particular point of attraction likewise was the HC-900 personal computer from the Combine Microelectronics in Erfurt. It consists of a basic unit with a typewriter keyboard. Furthermore, a magnetic tape cassette is also included in the scope of delivery. This cassette contains several gam programs and a Basic interpreter. According to information at the Fair, the HC-900 can be used in the home and hobby area, for educational purposes, in the design and development area, as well as in crafts, trades, and small enterprises. Here too, one could not obtain price specifications from the manufacturer.

Too Expensive for Hobbyists

When asked about the chances of perhaps soon being able to purchase a personal computer, most of the interested parties shrugged politely. As they indicated, the available personal computers will first be sold to research institutes, universities, and other educational institutions, and possibly to a preferred and strictly limited group of persons. Consequently, the hobby computer fan initially will have no purchase opportunities at all. In addition, many of the interrogated persons believed that individuals would scarcely be able to afford one of the offered personal computers, because of the relatively high expected purchase price.

Another novelty also was the chess computer CM (Chess Master) from the Microelectronics Combine in Erfurt. This computer also stimulated lively interest. It involves a considerably improved version of the first GDR chess computer SC-2 which was already presented in 1981. According to a press release, the CM masters all the rules of chess. It recognizes checkmate and stalemate situations. Its library stores an extensive repertory of openings. Furthermore, it has available eight different playing stages and four random stages. The CM is equipped with a sensor board, which makes possible automatic recognition of figures through identification fields. The 8-bit CPU Type U 880 D again forms the core of this chess computer. As announced, the CM won second prize in the Chess Computer World Mastership in Budapest during the fall of last year.

The Quantity Process Computer qpc-2 was especially regarded by the technical public. This computer came from the Microelectronics Combine. According to its name, it is a scientific-technical microcomputer. In parallel with usual operations involving numbers, it can execute completely independently and without any preparation operations involving dimensional units in arbitrary fashion. According to further information, the qpc-2 understands more than 100 "elementary" dimensional units, which can be chained among one another arbitrarily in the form of a power product. Furthermore, they can be provided with an arbitrary decimal prefix or with an exponent.

Microcomputer Excites Great Interest

The microcomputer recognizes and processes units of all variables, which are formed arbitrarily from symbols of a standardized inventory of unit and decimal-prefix symbols. It automatically generates units for the resultant

quantities and in this connection supports the units of the international system of units. Furthermore, it makes possible arbitrary conversion between units, and also the output of variables with certain units that are prescribed as parameters. Besides this basic computer system, there are also two other system variants. They are all based on the 8-bit CPU U 880 D. They have an alphanumeric keyboard and display and have available a supplementary memory. As was emphasized, up to now there are no computers of this type in other countries. Consequently, patents have been applied for and granted in numerous Western industrial countries, for example in the U.S.A. and in the Federal Republic.

The so-called modular microcomputer system MMS 16 also belongs among the computer systems that were shown for the first time. According to information available at the Fair, it has a "extreme modular structure and is expandable by a multiprocessor-capable system bus according to IEC as well as a bus hierarchy with main buses and secondary buses". A "high integration level on a double European card in multi-layer technology" is guaranteed. The 16-bit CPU K 1810 WM 86 from the USSR forms the core of this computer. The MMS 16 is a joint development of Robotron Dresden and five other GDR electronic combines. The MMS 16 is intended to be used both in numerical controls, to control device and machine complexes, in CAD/CAM systems, and also for commercial and scientific-technical calculations and for text processing.

Deficiency of Software Solutions for Production Control

Machine tool construction in the GDR presented a relatively broad spectrum of new and further developments. It comprises check and center lathes, gear-wheel generating grinders as well as various production cells which sometimes are equipped with industrial robots. In this industrial area, too, the proportion of machines equipped with microprocessor controls has in the meantime increased further. However, the technical people from the GDR recently made the criticism that at this time, the GDR industry is still suffering from a major deficiency of EDP programs for controlling large automatic production sections. Software solutions for direct production control at the present time supposedly still have "the smallest fraction" within the total software inventory.

At this Fair, it once again became clear that the Microelectronics Combine is considered the real center of microelectronics in the GDR. At the present time, it includes 23 enterprises with about 60,000 employees. In 1983, its production volume of electronic components amounted to 1724 billion GDR marks. The production program currently comprises a total of 1086 types electronic components. It was said that, in the previous year, 135,000 units of microprocessors were produced. Technical people in the GDR admit, however, that there are still various problems in dealing with microelectronics. Excessive production costs and constantly shrinking innovation cycles cause the greatest difficulties. Existing problems are supposed to be solved by increased co-operation in research, development, and production as well as by increased trade with the USSR and the remaining CEMA countries. Mutual deliveries and services were already agreed on during the Fair with Bulgaria, the CSSR, and the USSR.

Not Much New From the Other CEMA Countries

A variegated production spectrum was offered by the external trade enterprises of the remaining CEMA countries. This likewise was supposed to show the indigenous performance status of microelectronics. As already in the previous year, Bulgaria, represented among others by the external trade enterprise Isotimpex, exhibited electronic components, products of electronic computer technology, and various systems for production automation. Among these the further developed text processing system ISOT-1020-C, the 8-bit personal computer ISOT-1031, as a new development, minidisk and tape memories, the video screen terminal EC 8556, and the two 6-axle industrial robots for assembly and spray lacquering, based on ICs from inhouse production, all deserve special emphasis here.

The Fair exhibition program from Czechoslovakia also had a similar structure. The external trade enterprise Kovo had exhibits in the area of computer measurement technology, including among other things the microcomputer system SM-52/11 including peripherals, the microprocessor-controlled drawing system Digigraph 1208 A, 3.5 G, and also a microprocessor-controlled automatic measuring device. Again, one could see active components from the Tesla Works, such as for example dynamic and static RAMs as well as the 8-bit CPU MHB 8080A. The offering at the Fair was rounded off by various machine tools and a manipulator.

The years 1983 through 1985 are considered in Poland as years of consolidation of the national economy. The disturbed economic equilibrium is supposed to be reestablished with a "complex program". This is to be achieved primarily by means of microelectronics. In Leipzig, the Fair offering also concentrated on products of electronic computer technology, electronic components, and automation systems. Thus, EDP peripherals such as the matrix printer D-100, D-180, and D-200, terminals, and the 8-bit microcomputer system RTDS-8, all produced by the Mera Works, were exhibited. The external trade enterprise Technoimpex exhibited, among other things, CNS machines of Type EAP-320 as well as the industrial robot IRb (in two designs with five and respectively six axes of motion). As already in the previous year, so again this time various new electronic components could be seen from the industrial enterprise Unitra-Electron, for example MOS and CMOS ICs.

Hungary With Nose in Front

While the Rumanians could exhibit nothing new, Hungary this year too presented a considerable spectrum of its production program. In Leipzig, various electronic components, some of them new, were again presented, among them also a series which was developed in collaboration with the GDR. The first development results of the production enterprises and research institutions that are active in the component sector were credited, for example, to the communications industry. This industry exhibited in Leipzig, among other things, the fully electronic telephone exchange type EP 128 with program control.

Various device demonstrations indicated that microelectronics in the meantime has led to innovations both in the area of medical engineering and in the area of measurement engineering. Videoton, the largest manufacturer of computer products in Hungary, was again represented with a series of products, some of them new. The computer system EC 1011/C including peripherals, which belongs to the Rjad computer family of the CEMA countries, was exhibited, likewise terminals of Type VDN 52 576 and 52 578, the all-purpose minicomputer system VT 20 (with Intel CPU 8088), which had already been exhibited 2 years ago, and the personal computer SLK-80 including a floppy station, printer, and color television as data display unit.

Within the framework of the branch complex "Electrical Engineering/Electronics", the external trade enterprises Elektronorgtechnika exhibited various products in the Soviet pavillion. These included the "dialogue computer systems DWK Elektronika NZ-80-20/1 and NZ-80-20/2", which were already presented in the previous year. According to information at the Fair, these represent "a basically new class of universal microcomputers". Both consist of a 16-bit computer and display. The model NZ-80-20/2 additionally has a floppy disk and a thermoprinter.

From the area of electronic computer technology, one can further see as a model the universal computer system EC 1036, which belongs in the Rjad computer family, the microcomputer SM 1300, which was distinguished with a gold medal at the Fair, as well as the data processing system SM 1600 (with double processor). Furthermore, various electronic components could also be seen from the spectrum of exhibits that was already shown at the same place a year ago.

8348
CSO: 8120/1871

STANDARD ABBREVIATIONS FOR CIRCUIT COMPONENTS, LAYOUTS INTRODUCED

East Berlin RADIO FERNSEHEN ELEKTRONIK in German Vol 32 No 5, 1983 pp 279-280

[Article by W. E. Schlegel, editor: "On Using TGL 16082/02"]

[Text] GDR standard TGL 16082 has been mandatory for new electrical circuit diagrams since 1 January 1983. It governs abbreviations of electrical and electronic components and assemblies and in particular on page 02 the code letters to be used for them. In contrast to those customary until now, but not standardized (T = transistor, D = diode, Fi = filter, etc.), there are, except for the designations R, L and C for resistors, inductors and capacitors which were kept, considerable differences now; industrial circuit diagrams which we have reprinted were often already made according to this standard. It has also been used in our publication since issue number 1 (1983).

Since some of our illustrations were made long before this TGL applied to us, we had to use the previous and the new notations at the same time. This should change quickly. This, however, also requires effort on the part of our authors and the readers who may appear as authors in our publication. For them and all technical colleagues who are not yet familiar with TGL 16082/02, we are publishing the major definitions in this standard as an aid in tables 1 and 2 on page 280. In doing so, we naturally restricted ourselves to only the entries that concern our specialty.

All entries were taken from TGL 16082/02, but revised and shortened to meet our needs. That seemed necessary to us since the Leipzig Electrical Energy Equipment Manufacturer Combine VEB, a combine for power engineering equipment, was responsible for drafting the TGL. TGL 16082/02 contains the definitions of CEMA standard ST RGW 2182-80 (mandatory for contractual relations for economic, scientific and technical international cooperation since 1 January 1984) in accordance with the Convention on Use of Standards in CEMA; IEC Publication 113-2 (1971) and IEC Document 3B (central office) 27 of March 1981 were also taken into consideration.

The comments read [1]: "Users of this standard should submit additional definitions to standardize the code letters in accordance with TGL 16082/01 for separate specialties in electrical engineering based on this standard."

Unfortunately, there are contradictions in this standard which make it difficult to apply. For example, the abbreviation for trigger is T or TT for a two-stage trigger according to TGL 16056. But according to TGL 16082, T is reserved for transformers and transfer devices, while triggers are to be interpreted simply as binary elements designated by D. It is also difficult to understand, for example, why LED indicator components are designated by H while individual light emitting diodes, used mostly only for indicator and signal devices, are called B; however, on the other hand, ultimately, semiconductors (diodes) have to be designated by V and also according to TGL 16082. The use of V for semiconductors and tubes is likewise not satisfactorily resolved: A monolithic integrated circuit is ultimately a semiconductor and thus should be designated as V; however, it is designated according to function as D (digital) or N (analog).

Standards should be unequivocal and above all fit the needs of the user. We welcome each standard because of the associated unity in communication, compatibility of equipment and devices, simplification of international division of labor and facilitation of technology transfer. In this case, however, we fear that international technical understanding is being hindered rather than facilitated.

Table 1. Code letters for designating components, parts, devices and assemblies

A assemblies, subassemblies (slide-in modules; lasers; masers; plug-in cards; electronic accessory devices; assemblies and subassemblies which form a design unit, but can not be clearly assigned to other code letters)

B converters of electrical quantities into non-electrical quantities or vice versa (thermoelectric sensors; thermocells; photoelectric cells; microphones; loudspeakers; measurement converters; radiation detectors; pick-ups; magnetic heads; light emitting diodes)

C capacitors, piezoelectric crystals

D binary elements, delay devices, storage devices (delay lines; bistable and monostable elements; logic elements; IS [integrated circuits = IC's] with binary and digital functions; digital controllers and computers; core storage; digital-to-analog converters; drum and magnetic tape storage devices)

E miscellaneous (illumination devices; heating devices; electrical controllers; devices not specified in this table)

F fuses of any type

G generators, power supplies (batteries, oscillators; crystal generators; inductors; main power supply units)

H indicator and signal devices (optical and acoustic signal devices; signal lights; LCD and LED indicators)

K relays

L inductors

M motors

N analog elements, analog amplifiers, analog controllers (IC's with analog functions; analog controllers and computers; operational and inverting amplifiers; impedance converters; analog-to-digital converters)

P measuring and checking devices (indicating, recording and checking devices; clocks, counters)

Q power switching devices

R resistors (also thermistors and varistors)

S switches

T transformers

U modulators; converters of electrical into other electrical quantities (discriminators; demodulators; coders; inverters; converters; telegraph translators; remote control devices; optocouplers; frequency modulators; frequency converters)

V tubes, discrete semiconductors (electron and gas discharge tubes, transistors, diodes, crystals, ballasts; thyristors; triacs)

W communication paths, waveguides, antennas (directional couplers, dipoles; antennas; lightguides)

X connections and plug connections (break plug connections; test jacks; terminals; plugs; receptacle sockets; sockets; all plug connectors and pins)

Y electrically controlled mechanical devices

Z terminals, forked repeaters, filters, equalizers, limiters (balancing networks; dynamic controllers; all filters)

I, J and O are not allowed

Table 2. Some keywords

acoustic signal devices	H
adjusters	Y
analog computers	N
analog controllers	N
analog integrated circuits	N
analog-to-digital converters	N
antennas	W
assemblies (when no other code letter is assigned)	A
balancing networks	Z
ballasts	V
batteries	G
bimetal triggers	F
bistable elements	D
break plug connections	X
brushes	X
capacitors	C
clocks	P
coders	U
comparators	N
connector pins	X
core storage	D
couplings	Y
crystals	V
delay lines	D
demodulators	U
dial lights	E
digital computers	D
digital controllers	D
digital integrated circuits	D
digital-to-analog converters	D
diodes	V
dipoles	W
directional couplers	W
discriminators	U
electron tubes	V
filters	Z
frequency converters	U
frequency modulators	U
fuses	F
gas discharge tubes	V
generators	G
heating devices	E
illuminators	E
impedance converters	N
indicators	P
inductors	L
integrated circuits: see analog and digital IC's	
integration metering devices	F
inverters	U
inverting amplifiers	N
inverting amplifiers	N
lasers	A
LCD indicators	H
leakage devices	F
LED indicators	H
light emitting diodes	B
lightguides	W
lights (signal lights)	H
logic elements	D
loudspeakers	B
magnetic heads	B
magnetic tape storage devices	D
magnets (general)	Y
main power supply units	G
masers	A
measurement converters	B
microphones	B
monostable elements	D
motors	M
operational amplifiers	N
optocouplers	U
oscillators	G
overload current triggers	F
photoelectric cells	B
pickups	B
piezoelectric crystals	C
plug connectors	X
plug-in cards	A
plugs	X
potentiometers	R
power supplies	G
protective relays	F
push buttons	S
radiation detectors	B
receptacle sockets	X
rectifiers	G
relays	K
remote control devices	U
signal lights	H
slide-in modules	A
sockets	X
subassemblies (when no other code letters are assigned)	A
surge voltage triggers	F
switches	S
terminals	X

thermistors	R	transistors	V
thermocells	B	triacs	V
thermoelectric sensors	B	underload voltage triggers	F
thyristors	V	varistors	R
transformers	T		

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8545
CSO: 2302/60

ENVIRONMENTAL PROTECTION PLANS, SHORTCOMINGS OUTLINED

Priority Tasks

Warsaw RADA NARODOWA GOSPODARKA ADMINISTRACJA in Polish No 14-15, Jul 84 pp 47-50

[Article by Stefan Jarzebski]

[Text] In 1983, the Sejm passed a law to create the Office of Environmental Protection and Water Management. The sphere of activities of this office is as follows: environmental protection, especially of the soil, water, air and foliage; protection against noise and radiation; preservation of the water economy--rivers and streams--and protection against floods. The office coordinates the work of state administrative agencies and collective and social organizations in the area of environmental protection. This includes the introduction of new environmental technology and techniques.

The basis of activity is long-term programs for environmental protection based upon prognoses and studies.

The office implements these tasks through the subordination of five water economy management districts (Warsaw, Poznan, Krakow, Wroclaw and Gliwice), of management of the Oder waterway in Wroclaw, management of the development of the Upper Vistula in Oswiecim and the Office of Environmental Results Evaluation. The National Survey of Environmental Protection is subordinate to the chief of the office. Scientific research is conducted by institutes in cooperation with the Information Center for Environmental Protection and Water Management.

The Office of Environmental Protection and Water Management also has founded three project offices--Hydroproject, Prosan and Hydrosan--and nine executive enterprises.

Direct supervision and control of environmental protection and the sensible use of water resources are under the control of regional administrations. Also active are 49 provincial centers of research and environmental control that are supervised by the Office of Environmental Protection and Water Management.

* * *

The Office of Environmental Protection and Water Management began its work during a period of social concern over the advancing state of environmental degradation. This degradation was characterized most specifically by excessively polluted ground water, air, soil and devastation to living organisms The principal cause of the polluted water is the deposit of 4.7 billion cubic meters per year of industrial and municipal raw sewage, of which only about 40 percent is treated. Emitted into the atmosphere are 2.5 million tons of dust and 5 million tons of gases that pollute the air and devastate the soil, forests, water and people's health. They also cause immense economic losses.

Sewage discharged into rivers and lakes exceeds the waters' self-cleaning capacity and is destroying all biological life. The accidental pollution of the water is increasing. The Baltic's waters are polluted, especially the bays of Gdansk and Puck, which has caused the periodic closing of the beaches.

Our economy is characterized by the use of natural resources and energy, which not only calls for the extraction of these resources but also leaves wastes harmful to the environment. A negative influence on the environment has been the accumulation of industrial waste--1 million tons occupy 10,000 hectares. Most of this industrial waste is in the provinces of Katowice, Legnica, Krakow and Walbrzych.

Environmental pollution and the disturbing ecological balance also come from agriculture. This is especially caused by the poor location of stock-raising farms and the incorrect use of chemicals in agriculture.

The last survey of views on the environment, confirmed by scientific studies, reports and social and technical opinions, confirms that conditions in the environment are not good. Poor or underutilization of equipment, lack of technological discipline and economic difficulties are cited as the reasons for this state of affairs.

The management of natural resources, energy raw materials and water arouses serious reservations. This is why one of the tasks imposed on the enterprises is the introduction of methods for the careful use of natural resources and better exploitation of equipment to protect the environment.

Negligence of environmental protection has occurred in many spheres of economic life in our country. This has resulted in the necessity to establish immediate and long-term actions. These include new capital investments and effective utilization of already existing investments in the enterprises. The latter can be achieved through proper exploitation of existing environmental protection equipment, measurement of activities affecting the environment and perfection of services for environmental protection. These actions require administrative, economic and legal stimuli. The Office of Environmental Protection and Water Management should and will conduct active and dynamic policies in all of these spheres.

It should be emphasized that this unsatisfactory situation existing in environmental protection and the water supply is accompanied by an increasing social awareness of the threat to the environment. This awareness has resulted in

increased pressure for active environmental protection, especially in capital investments. There is a big difference between the social expectations and current possibilities in the country. As a result, the newly created Office of Environmental Protection and Water Management has to act.

The Basic Issue--Stopping the Process of Environmental Degradation

Placed the Office of Environmental Protection and Water Management has been the task of stopping environmental degradation in Poland.

Sources of pollution and threats to the environment have been identified. A plan of tasks to halt the degradation to the environment has been worked out through 1990. The plan will need to be ratified and submitted for public comment. We have taken under consideration the increase (in the successive economic plans) in central and provincial capital investments. Taken under advisement have been broader economic and legal mechanisms to mobilize the enterprises to protect the environment. Sensible utilization during a period of increasing capital outlays will force production plants and construction enterprises to build and use equipment to environmental protection. We have had such industry in our country.

1. During the next few years, the most urgent capital investment tasks for water protection will be to finish the construction of 350 purification plants, whose exploitation should increase purification plant output by about 5.3 million cubic meters for a 24-hour period.

2. In the area of air pollution, badly needed is the completion of control capital investments in enterprises that emit pollutants that are very dangerous to human health. If these installations are completed, 1.0 million tons of pollutants per year will be eliminated from the air.

3. With respect to the land, new landfills will have to be constructed for both industrial and municipal use. Another 10 million tons of waste could be stored per year as a result.

The central plan for 1984 earmarks about 30 percent more funds for environmental protection than in 1983. Outlays for 1984 are mostly for water protection at 60 percent, with 20 percent for air and 20 percent for land. Currently, most environmental control activity is taking place in urban-industrial concentrations: the Upper Silesia industrial region; the coppermining region of Legnica and the provinces of Krakow, Szczecin, Warsaw and Bielsko-Biala. Construction of water purification plants in Warsaw, Elblag, Gdynia, Chorzow, Sosnowiec, Siemianowice, Lublin and Lodz is continuing. Municipal and industrial water purification plants completed in 1984 will increase output by about 490,000 cubic meters per day and 740,000 cubic meters, respectively.

In the area of air pollution, outlays were earmarked almost exclusively for dust-collecting devices (precipitators). This equipment will be installed at power stations in Belchatow, Stalowa Wola and Jaworzo II, at heat-generating plants in Wroclaw, Czechnica, Krakow-Leg and Kaweczyn Lodz IV and at the paper plant in Kwidzyn and the Police and Knurow chemical plants.

In 1984, 98 percent of the funds for soil protection were earmarked for industrial landfills. It is planned to increase these industrial landfills by about 5.4 million tons for new industrial waste.

In this situation of limited capital investments in our country, it is particularly important that the office initiate tasks whereby the industrial plants used existing equipment to the fullest efficiency in order to protect the environment. These tasks include:

--making periodic inspections of installed environmental protection equipment (inspections for 1984 are being conducted);

--issuing warnings to enterprises to require proper use and care of environmental protection equipment;

--removing of errors committed already in projects;

--assuring the proper supply of spare parts;

--improving the level of service to environmental protection devices through complete education of the service personnel and ensuring employment possibilities for qualified staff.

We estimate that the implementation of these tasks in the area of water protection will reduce water pollution throughout the entire country by approximately 15 percent.

Initiated by the Office of Environmental Protection and Water Management and carried out by the enteprises, environmental protection tasks will follow regulations for production progress and improvement. Much better coal is needed for the power plants that are located near health resorts. Protection of the soil requires extensive recultivation of landfills and ash from the Lenin Steelworks can be used for road construction.

Implementation of capital investments and the proper utilization of water purification plants and air pollution control equipment demands (as stated above) the development of equipment to cover the country's environmental needs. Work toward improving this situation relies on adapting the production base in the country to the office's coordinated tasks, in cooperation with the steel, engineering, construction and forestry industries, as well as agriculture.

Despite the country's difficult economic situation, 10 large water reservoirs have recently been constructed: Dobczyce on the Raba River; Dziechowice II near the Przemsza River; Klimkowka on the Ropa River; Dobromierz on the Strzegomka River and Bukowka on the Bobr River. These reservoirs will supply badly needed water to the cities.

Another issue with respect to water is the proper use of the waterways for transportation purposes, especially the Upper Vistula. The Oder River is underutilized.

Implementation of a program for the most crucial capital investments should begin the process of halting environmental degradation.

Under Conditions of Economic Reform

The possibility of directed activity and the planning of undertakings are currently limited. All initiatives are now in the hands of the enterprises. A motivation system using economic stimuli will have to be used to carry out these activities. The work of the Office of Environmental Protection and Water Management is to change and to complete the economic and financial incentives needed for environmental protection, especially in the areas of:

--income tax (reduction in the income tax if the enterprise has invested in environmental protection);

--redemption (exemption from the obligation to pay into the budget for environmental protection);

--State Fund for Professional Activation [PFAZ] (exemption from the PFAZ salaries for workers involved in environmental protection);

--credit to collective units (prolonging the deadline for repaying credits and lowering the credit rate but only for capital investment for water protection);

--payment system for using the environment and fines for breaking rules designed to protect the environment;

--subsidy from earmarked funds (Water Management Fund and Environmental Protection Fund);

--raw-materials and energy means to broaden government orders to protect environmental testing equipment;

--bookkeeping methodology through the introduction of good enviromental and pro-ecology decisions;

--economic planning that includes responsible environmental planning;

--financial system that urges the creation of an Environmental Protection Fund in the enterprises.

Some of the most important means of influencing environmental protection are water protection laws and executive acts. It is often necessary to change the laws to coincide with changes in socioeconomic factors. Conditions for amendments also come through use of the law.

In the near future, we anticipate some amendments to water law. Among these are Article 135, which allows for exemptions from building water purification plants, and Council of Ministers Order of 29 November 1975 regarding water classifications, sewer conditions and penalties.

Work has also begun on laws concerning protection of the seas.

The Council of Ministers has begun the process of amending acts regarding soil conservation.

It is very important to increase environmental monitoring activities. Work in this area can proceed in two principal areas:

--increase the measurement and control tasks of the regional services;

--verify and improve present methods of measuring air and water pollution.

The implementation of these goals depends on:

--gradual improvement in providing the regional services with environmental measuring equipment and replacement of currently used manual equipment with instrumental equipment. This will permit the elimination of time-consuming methods of data collection with those that provide measuring devices that are not used much (i.e., those measuring heavy metals in the water);

--improvement in providing the regional services with transportation adequate to cover the designated areas;

--improvement of environmental testing equipment that will provide more accurate data.

Actions limiting environmental degradation must be commenced at the source of the pollution. These actions are to a large degree hindered by technical, economical and even habitual factors. Therefore, these actions should be concentrated on the following issues:

--working out a plan and instituting technology to recover waste deposited in sewers from raw materials or semi-manufactured products;

--instituting industrial methods for the desulphurization of fuels and fumes;

--working out a adopting methods for increased use of waste.

Priority Tasks

Having recognized the level of environmental degradation and the underdevelopment of the water economy in Poland as dangerous and contrary to the country's economic development, the Office of Environmental Protection and Water Management must establish tasks and priorities for environmental improvement. These tasks will take place through program and planning work economic and administrative actions and conditions to inspire action by society:

--full creation and use of the water infrastructure;

--concentration of funds on the completion of already started capital investments for environmental protection, especially water purification plants in regions where a water shortage exists;

--selection and production of environmental protection equipment;

--precise observation of environmental protection statutes;

--rational use of water;

--perfection of the incentives for industry to protect the environment;

--increases in the level of flood protection;

--increases in the outlays for environmental protection and the water economy, with simultaneous development of industry and construction.

The fulfillment of these tasks requires the development of control services and control over all users of the environment, an increase in the level of efficiency and law, the development of efforts to encourage the cooperation of all levels of society in environmental protection, the development of a technical and scientific base, the development of specialized schools, the support of the actions of water-sewer cooperatives, and deeper cooperation with the CEMA countries and learning from international experiences.

Together With Society

The law on environmental protection of 31 January 1980 and the law governing territorial self-government of 20 July 1983 show that environmental protection has become a priority and will play an integral role in economic planning in the future. In accordance with the regulations, regional administrators have to prepare economic plans for all of the provinces. Concepts for environmental protection on the regional and urban levels will result. Approximately 50 percent of the countries and cities already have certified economic plans with environmental protection components. This work will be completed in 1987.

The new law strengthens the position of the people's councils as representatives of state-government and self-government organs. The Office of Environmental Protection and Water Management will assist the people's councils and self-government in their actions and initiatives regarding environmental protection and water management.

The office will support the actions of urban and village residents, self-government, unions and other social organizations declaring their intention to protect the environment.

Initiatives by the Patriotic Movement of National Rebirth, self-government, the Chief Technical Organization, the League for the Preservation of Nature, the Polish Angling Union, PAX and the Polish Tourism Association especially contribute to the wise use of natural resources. They serve to educate people

on how to behave with nature, start actions to preserve installations or areas needing protection, organize social actions to replant trees, recultivate wastelands and clean sewers and ponds.

Among others in this period, thanks to social initiatives, over 20 multifaceted water cooperatives have developed to protect rivers, lakes and reservoirs from pollution. However, it must be stated that the number of these cooperatives is low in relation to the need. The Office of Environmental Protection and Water Management will support any new initiatives in this arena.

There has been recent intensification in the forms of social control on the areas where intervention is needed. Social cooperation in the area of planning and individual decision making as regards environmental issues has broadened. These initiatives have aided the regional services in their efforts on behalf of environmental protection. The Office of Environmental Protection and Water Management has also adopted a multipronged approach designed to strengthen the regional and administrative services for environmental protection as well as the State Inspection Office of Environmental Protection.

Continuing Industrial Pollution

Warsaw KURIER POLSKI in Polish 2 Aug 84 p 1

[Text] In 1974, the water law was amended. Plants that had been depositing raw wastes directly into the river now had 5 years' grace from paying fines. During the period, they were to have built water purification plants. Because the purification plants had not been built by 1980, the minister (then of administration and environmental protection) extended the "amnesty" for polluters for another 4 years. The deadline passes at the end of this year.

There are in Poland 13,500 plants that produce an adverse effect on water quality. All of them should have permits strictly enforcing how much water they can draw and how much waste they can discharge into it. And these permits can be obtained if a purification system exists. Six thousand plants have some sort of water purification system, but the systems are of poor quality. Their situation is doubtful, and after this year they will use water illegally. If these is to be total respect for the law, then these plants should be closed.

In the end, we are not concerned with this or that legal juxtaposition; we are concerned with the environmental degradation we all feel. Because most of these plants are very important for the country's industrial output, it is doubtful that the minister of environmental protection and water management will halt production after 1 January 1985. The plants will pay the penalties and do the same. The construction of water purification plants is the only real solution.

And in this regard the situation is very bad. In the entire country, only 300 water purification plants have been started. We cannot see the end of this work. We have been building water purification plants for Warsaw for 13 years. This is a disgraceful figure. The last projection calls for completion in 1987.

Environmental protection has been emerging slowly but steadily. More and more funds have been earmarked for stopping environmental degradation. This year's budget shows environmental protection second only to apartment construction in importance--36 billion zlotys.

But money is only half the suceess. For example, the new water cooperatives have money but cannot use it. There is a lack of people to carry out the tasks. Only an increase in performance with the increasingly steady flow of zlotys will make for better rivers and sewers.

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COMPUTER DEVELOPMENTS, APPLICATION DESCRIBED

Computer Application in Baltic Shipping

Gdansk TECHNIKA I GOSPODARKA MORSKA in Polish No 3, Mar 84 pp 118-120

[Article by Wlodzimierz Mikucki and Edward Wisniewski, Polish Baltic Fleet, Kolobrzeg: "Trends of Application of Electronic Computers at Polish Baltic Fleet"]

[Text] One condition for efficient utilization of the potential of a multi-unit port and shipping enterprise, such as the Polish Baltic Fleet, is adequate information support to the production of services and adequate circulation of data. The information flows circulating in an enterprise are subdivided into: anticipatory flows, which provide the data necessary for decision-making; simultaneous flows, which facilitate the generation of services; and delayed flows, which document the preceding events.

A tool that can largely improve the efficiency of an enterprise is computerization. A modern marine transportation company needs the support of electronic computer technology, particularly in management. A first step toward computer applications should be preparing the enterprise for the introduction of electronic computers, to be followed by installation of data processing systems which eventually can be integrated into a comprehensive information system of the enterprise.

Existing Electronic Computer Applications at the Polish Baltic Fleet

The initial computer applications at the Polish Baltic Fleet [PZP] date back to January 1980, when, according to an agreement concluded between the PZP and the Informatics Center of Marine Industries [CIGM], a section of the CIGM was set up at Kolobrzeg. It had the following equipment: a Datapoint-2200 minicomputer, a disk memory unit of 2.4 MB, a Centronics dot printer with 132 characters and 60 lines/min, DP-3600 screen monitors, ITT modem for data transmission, communication adapter and multiprocessor.

This configuration constitutes a terminal in a computer network with a central mainframe machine installed at computer center of the CIGM at Gydnia. The terminal can itself operate in an independent mode within the limited computational powers of the processor and the capacity of its disk memory.

The first electronic data processing system introduced at the PZB was the financial and bookkeeping system FK[1], which performed the following functions: financial calculations, estimation of costs and revenues, bookkeeping control of assets, financial results of enterprise activity, etc. The system operated in a remote mode: collected data were registered on a magnetic disk, transmitted to the central mainframe computer Odra 1305 and processed there. Two-way linkage with the mainframe computer allows retransmission of monthly results and printout of spread sheets through the printer installed at the PZB center at Kolobrzeg.

The FK system is supplemented by the Mesik module,[2] developed for the PZB, which speeds up the generation of economic reports, including data on costs of the individual boats and loading facilities.

Back in 1979, the CIGM developed for the PZB a computer system for reservations on passenger boats--Bukprom.[3] Due to organizational shortcomings and conditions beyond the control of the PZB (the economic and political situation, making it impossible to buy the necessary computers), the system was not brought into operation.

The current system, introduced in late 1981, was the inventory control system SEMO-2.[4] With the introduction of this system, manual inventory files were eliminated. The system produces a regular data compilation on inventory control, covering:

--quantitative and qualitative documentation on the status and circulation of materials;

--analysis of stock and utilization;

--calculation of material costs;

--calculation of supplier invoices.

The system is handled by the ZETO at Koszalin. Its introduction brought the circulation of documents at PZB into order, ensured their timely shipment and reduced the documentation labor costs.

Subsequently, wage systems were introduced at the PZB: for boat crews PZ system[5] and for industrial employees the PU system. Both systems automate the calculation of monthly bonuses for employees. They generate payrolls, wage statements for workers, compilations on wage funds and transfer orders to savings banks for workers who have savings and direct payment accounts.

In addition, in 1982 the first steps were taken to introduce a system in operation of passenger boats: passenger travel calculation system RPP. The system was tested on the Gdansk-Helsinki line. Because of limited capacity of Datapoint 2200 minicomputers, the industrial introduction of the system has been postponed until a later time, when the computation powers of the hardware will be increased.

The computer applications at the PZB are aimed in two directions:

1. Operation of sectoral documentation and statistical systems (FK, PZ, PU, SEMO-2). In addition to regular data compilations, they contribute to the organizational order at the user units of the enterprise. The systems of this class have been criticized for their low cost-effectiveness, since their operation costs more than manual processing.[6]

2. Introducing systems concerned with operation of the fleet. The general consensus is that operating such systems at ports and shipyards carries the greatest promise associated with computer applications at the PZB.

Planned Introduction of Computerization Systems in 1984-86

The low computational capacity of Datapoint-2200 minicomputers and difficulties with enlarging this configuration pose an obstacle to further development of computer systems at the PZB. The program for expansion of the computer systems and inclusion of users in sea industries to operate information systems in a sharing mode that has been launched by the CIGM in the latter half of the 1970's has met with difficulty at the PZB. The Polish Baltic Fleet is now inclined to take the route of modernized computer configuration at its own computing center based on computer systems that will operate in an autonomous mode.

In keeping with the directives of the Sea Industries Department concerning steps towards automation of food vending on passenger boats, the PZB in 1984 will start using computerized cash registers on the vessels "Pomerania" and "Rogalin" Before taking this decision, important for boat crews, a survey was taken of the register systems of Western and especially Scandinavian operators: Silia Line, Sealink, TT-Line and the technologies of food vending and hotel registration at the Victoria Hotel in Warsaw. The purpose was to provide computerized documentation of financial operations on the boat, calculate all data for each vending point and each member of the vending services in terms of sales and turnover.

The technology of computerized cash registers involves:

--introducing into minicomputer memory data on all trade and food sales and operations onboard ship;

--receiving daily qualitative and itemized reports for individual vending points and personnel;

--calculations for waiters, bartenders and shop assistants at any given point in time, such as verifying the cash on hand and required balance;

--generation of documentation for sales, exchanges, etc.

Of the various alternatives considered by the PZB in terms of computer hardware and cash register systems, the final choice was made of the system offered by the National Cash Register Company. The computer system of cash registers NCR-2160[7] is highly valued in Europe, and the techical and user parameters (such as the working memory of the NCR-3251 minicom-

puter, which is 256 kB) corresponds perfectly to the requirements of the PZB passenger boats and the needs of supply services.

On the scale of the whole enterprise, a modification of hardware infrastructure was undertaken at the PZB Computing Center at Kolobrzeg. It will be an integrated component of the cash register system and will also serve for running a package of software for management, particularly in the area of passenger boats.

The configuration is based on the NCR I-9020/45 computer,[8] with a working memory of 256 kB, disk memory units of 50 MB and line printer with 300 lines/min, as well as screen monitors installed at main internal users. The operation system is IMOS V. This equipment will allow running the system in an independent operation mode. Entry of data directly by internal users will involve basic changes of the processing operations, where, alongside spread sheet printouts to be produced regularly, elements of online dialogue processing are made available.

The new computing center based on this hardware configuration will provide the opportunity for introducing new systems, mainly in operating the fleet. Work has been resumed on the RPP system for calculation of travel lines, which has been expanded to include a system for calculation of idle runs, RPT. Both systems will compute the individual trips or groups of trips and generate multidimensional statistical spread sheets. Further work on these systems will be aimed at linking them with the FK and Mesik systems. This will become possible after the RPP and RPT systems are expanded to cover freight settlement documents. The entire configuration will make it possible to obtain final data on each trip just a few days after its completion (which currently takes more than two weeks) and will speed up the process of payment collection on accounts receivable.

Work has also been started on introducing a national system of boat passenger reservations. Using the experience obtained in developing and programming the Bukprom system and taking for the starting point the booking system of the Finnish Silia Line, called Seadata,[9] which is operated on the basis of a Univac V 77-800 computer, a system will be created that will provide booking lists and operate on-line for seat reservations from ticket agencies. The system will allow analyses of the utilization of individual allotments by sales agencies. An important element will be the capacity for having current data on travel agencies and offices linked up with detailed numerical documentation of tickets. Another improvement built into the system will be computer-generated tickets, eliminating the errors which are frequently seen with current practices. Another important element will be the link-up for data exchange between the central office and the agencies.

There are plans to base this system on the mainframe NCR-9020/45 computer linked up with the basic terminals at Gdansk and Swinouscje and the travel agencies in Warsaw, Szczecin and Poznan. Further plans envisage linking the national reservation system with computerized reservations systems of

general PZB agents at Ystad, Helsinki, Copenhagen and Travemunde and linking with reservation systems of airlines and hotels.

For 1985-86, there are plans to introduce more computerized systems--namely, a management information system, a travel calculation system and a system for technical inspection of the fleet.

Placing emphasis in computerization on decision-making and management function and information systems involves basic changes in organization and technology of data processing. The trend to connect the individual systems into larger networks or the reciprocal utilization of input data and files by different systems predetermines the future choice of technology for data banks in the form of a common data base of the whole enterprise.

Purpose-Oriented Model of Computerization System at the PZB

Based on introduction of successive sectoral computer systems, their further integration into a comprehensive information system is envisaged, which will be an aid to enterprise management. A model of this system is described by four structures:[10] functional, informational, technological and spatial.

A first approximation of the proposed functional system was presented by E. Wisniewski.[11] By ensuring that information flows retain the quantitative and qualitative features of the data, it will be possible to create the information system in support of PZB management. The data in the system will be organized in several main files, ensuring an efficient flow of information according to the following principles: one-time registration of events and elimination of time limits in data access. The information system of the PZB will make it possible to use data without limitations in all necessary combinations. The system will be based on a data bank with its individual specialized data bases.

The technological structure of the system will provide the necessary hardware support. The NCR I 9020/45 configuration, thanks to its modular design, will enable the central mainframe to be expanded to 512 or 1028 kB, or a number of disk memory units that will be sufficient for practical purposes. This is ensured by the computer hardware design corresponding to the needs of a comprehensive system. NCR equipment meets the stringent requirements of computer hardware, including: hierarchical organization (data registration devices, digital unit operating in a mutliprocessor mode with time sharing), the capacity for remote processing and central mainframe computer controlling a centralized data base, operational reliability, large computational power and the capacity for data registration at the origination site.

As regards the spatial aspect of the PZB information system (computing center, passenger boat bases, weather report offices and ships), efficient and rational location of processors and terminals of the computing network is essential. Three processors are to be installed at the computing center. The terminals at boat bases and weather bureaus, as well as at agencies,

will ensure that the PZB information system will cover a broad territory, including the aquatorium of the Baltic Sea.

A complete description of the model of the information system for the PZB management support has been prepared by E. Wisniewski.[12] Implementation of this model is planned for 1988.

Successful realization of the purpose-oriented information system at the PZB will depend on adequate conceptual solutions, as well as certain requirements in organizational preparation of the enterprise. The experience gained in introducing industrial systems suggests that social and psychological barriers are gradually surmounted during the course of practical system operation.

The management of the PZB is undertaking steps to prepare the enterprise and its environment for the innovation and to bring into effect the solutions involved in this project.

Expected Effects

The economic effects of computerization will involve certain costs in the purchase of electronic computer equipment and employment of a group of specialists. An analysis of costs already incurred and estimates of future system costs is essential.

So far, the informational activities of the PZB based on the configuration of the Datapoint-2200 minicomputer have involved an average annual cost of 6 million zlotys. The economic effects are difficult to measure, because they are mainly concentrated in calculation and documentation. Purchasing new computer equipment for two boats and for the computing center at Kolobrzeg will cost about 30 million zlotys. In addition, one-time reprogramming of current systems of other centers will cost 3 to 5 million zlotys. Altogether, the second stage of PZB computerization will cost about 35 million zlotys.

The expected effects of introduction of computerized cash registers on the "Pomerania" and "Rogalin" will be the following:

--increased profitability of nontransportational activity by 3-5 percent, that is, 4 to 7 million zlotys through improved profitability of food vending and sales through elimination of possible waste and pilfering by 7 to 10 percent, i.e., 10-14 million zlotys.

The introduction of computerized cash registers will increase the enterprise profits by about 17.5 million zlotys annually.

A further factor of savings will be the elimination of the cost currently incurred in payment for services of the CIGM and ZETO at Koszalin currently amounting to some 5 million zlotys per year. This figure, however, should be adjusted by discounting the cost of development of in-house computation center, estimated at 800,000 zlotys annually. An additional effect will be

obtained from reduced cost of the enterprise through possible utilization of network communications instead of the more expensive Telex lines. The resulting savings are expected to amount to about 0.5 million zlotys per year.

Further effects from computerization include an expected reduction of the labor force. The projections are that the work force at operational and accounting services will be decreased by 15 to 20 jobs, corresponding to a savings of 3 to 4 million zlotys per year. The unquantifiable effects of computerization will include elimination of costs caused by human error, expected material savings, shorter customer service in booking and ticket sales and avoidance of double booking on ships.

In 1984, there will be a shortfall of only 8 million zlotys for complete funding of the costs of the second phase of computerization. Total measurable effect of the coming three years (1984-86), however, is expected to raise the profitability of the enterprise by approximately 40 million zlotys.

FOOTNOTES

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4. "System gospodarki materialowej SEMO-2" [System of materials inventory management SEMO-2], Bydgoszcz, ZETO Documentation, 1977.

5. "System plac pracownikow plywajacych PZB-PZ" [System of payroll and wages of PZB crew members--PZ], Gdansk, CIGM Documentation, 1982.

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11. E. Wisniewski, "A model of management information system for the Polish Baltic Fleet," PRZEGLAD ORGANIZACJI, No 10/80.

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Compan-8 Computer for Science

Warsaw RZECZPOSPOLITA in Polish 21 Jun 84 p 3

[Article by Witold Blachowicz: "Theory Confirmed by Practice: Science's Offering for the Time of Crisis"]

> [Text] The very names of informatics, computer science and complex system design seem to convey a sense of awe and respect. The causes of this reverence may vary, but probably the main mystery lies with the inherent striving of man to create something in his image and likeness, the "intelligent" machines and equipment that will help man, replace him and, to an extent, think.

These difficult and nontrivial tasks require efforts of competent experts from various fields of knowledge. The complexity of problems, their hermetic nature and advanced specialization are fraught with certain dangers. One is that there is a convenient environment of "information drifters," those who for many years manage to specialize exclusively in studies of "theoretic principles," as they have been characterized by one professor. These pseudospecialists can be found in practically every field, but in information science and computers they are more difficult to expose, since theory, which is extremely important and quite real in this area, has certain arcane features, making it difficult to understand for the lay public.

The scale of the problem can be gauged by a comparison of the general state of the economy, such as its modernization, degree of automation, systems of manufacturing and design, with the number of "experts" investigating the "theoretical principles." Such comparisons in Poland give grounds to be worried.

Changed Concepts

From 1940 to 1975, the tendency in development of information science was to develop increasingly larger systems and computers accessible to a limited number of individuals. A formalized language made it prohibitive for the average user, and a minor error in the language caused the computer to refuse to execute a command. Large computer centers stood apart as

modern ivory towers accessible to only the select few, charging increasingly higher fees for their mediation services.

In 1975, small firms began to develop the concept of computer configuration adapted to the needs of ordinary people and their interests. A different method for man-computer communication was invented through the introduction of so-called interactive processes that to a certain extent resembled communication between individuals. In this new version, a computer program need not be as specific and formal: screen replaced paper, gradually improving systems and programs. By scientific research and development, a broad range of so-called personal computers was created, beginning from popular models to more sophisticated professional ones. The slogan of "bringing the computer to the user" was thus brought into effect and specialists in various fields acquired a helpful tool for their everyday work.

Our Own Forces

The Institute of Systems of Comprehensive Automation of the Polish Academy of Sciences at Gliwice, headed by Professor Stefan Wegrzyn, has always combined two elements in its activity: basic research and practical utilization of results. Here, the concept of automation was developed for many production processes, and a large number of these systems have been built and are successfully working at glass mills, in shipbuilding, at the Katowice Metal Works and other industrial enterprises. This approach is probably dictated by the specific conditions of Silesia, where close contacts with industry and hard-working people resulted in an attitude at the institute where theoretical developments are subjected to practical testing. Probably for that reason the professor and his, mostly young, colleagues enjoy a genuine recognition and even respect in the industry.

Lately, the institute at Gliwice scored another success. The current worldwide "craze" in this area is the personal computer. Thanks to this, new scientific groups, laboratories of industrial concerns and famous companies in industrialized nations now can accelerate the development of new designs, new methods, processes and products. There is no doubt that the Polish economy could emerge from the crisis much faster and accelerate the pace of research and development. The professional microcomputer ComPAN-8, developed and built at the Institute of Systems of Comprehensive Automation of the Polish Academy of Sciences at Gliwice, jointly with the Enterprises of Computer Systems Mera-Elzab, will certainly serve these purposes. The computer is intended and applicable for support of engineering design and work of industrial process operators, medical diagnostics, automation of many types of scientific research; it can be used as a terminal of "intelligent" computer systems. In addition, it can be used for clerical work to improve the efficiency of management and data processing, featuring a broad spectrum of applications.

Without going into technical details (because of the limited space), it should be mentioned that the basic parameters of the ComPAN-8--the operation scope and potential--are on a par with mainframe computers currently used in Poland and are not below similar personal computers produced in other countries. The system is based on domestic components with a minimal use of elements imported from CEMA nations.

The ComPAN-8 corresponds in its equipment class to a high European standard, which is especially valuable since its concept was developed at a Polish institute. Thanks to special electronic systems, software and screen, this domestic microcomputer features a graphics system for output of calculation results and designs. This is helpful for designers, allowing them to select optimal alternatives and the best solutions within a short time. The authors provided for easy link-up of the ComPAN-8 to large computers with powerful calculation potentials and large data files. The ComPAN-8, therefore, can operate as a so-called "intelligent" terminal of a large mainframe system. In this way, it can relieve the large and expensive system by performing various specific tasks for professionals in various areas.

Already Working

The ComPAN-8 was presented at one of the latest sessions of the Department for Technical Sciences of the Polish Academy of Sciences. The computer operated smoothly, demonstrating various capabilities in technological and medical diagnostic applications. The authors promise further expansion of its capacities. In the meantime, at the Computer Equipment Enterprises Mera-Elzab in Zabrze the first 20 units of the microcomputer are being manufactured in close contact with the specialists from ZSAK PAN. Next year, 200 more units will be produced, and with increasing orders the production is expected to be brought to several thousand units annually. The computer has caused interest also in other countries, so that there is a chance of exporting it. Hopefully, the export orders will not deprive domestic research institutes and factories of their chance of buying the ComPAN-8.

One should hope that the effective practical application of original research and information science in this difficult and critical period will bring tangible benefits. We should not be discouraged by the disparaging voices claiming that it is useless, that foreign firms have gone much further and that only so-called "large networks" are important--or that overseas grandmothers are buying exactly such (?) computers as a toy for their grandchildren's birthdays. In the meantime, incomprehensibly, professional microcomputers of this particular type are placed under embargo in many countries. Has anybody heard of "children's toys" being guarded so fervently? Is this just a case of plain jealousy? Maybe! At any rate, in much more affluent and developed nations than Poland, interest in personal computers is still on the rise. It is good that we have taken a step forward on this road, which does not mean that creative contributions and efforts of scientists who made that step have been given the credit they deserve.

Computerized Telephone System

Warsaw KURIER POLSKI in Polish 24 Jul 84 pp 1, 2

[Article by (ben): "Modern Telephone Communications; Computer Wakes Up, Connects, Finds People"]

[Text] Residents of the Great Poland have been brought into the modern communications age. Poznan now has a new central telephone exchange of the E-10 type, now serving 13,000 residents of Nowe Miasto district. Initially, about 60,000 subscribers will be using it. Changing over from the old electromechanical equipment to the new network was difficult. It was the largest technical operation in the history of the Poznan telephone exchange. For the first time, a new type of computer, the R-11, was brought into operation, which collects and processes data on subscribers and in the future will manage as many as three telephone exchange stations.

Subscribers with numbers beginning with 776, 777, 779, 790 and 791 have been switched from the Winograda E-10 exchange (which was the first facility of its class in Poland) to the new exchange. The subscribers with five-digit have received new six-digit numbers. Thanks to the new exchange, capacities at old stations at Winogrady and Debiec have been freed, which will allow adding 4,000 new subscribers to them. The new exchange also offers a prospect for development of telecommunications, in particular at Czerwonak, Mosino, Kornik and Swarzed.

The R-11 computer not only replaces the telephone operator. One can put in an order to be woken up at a certain time by dialing 976 and selecting the numbers indicating the hours: for instance, 0600 is 6:00 a.m. If a number one is calling is busy, the caller can dial 0 and thus enter the number into the computer memory. As soon as the number becomes free, both telephones will ring. A doctor leaving his office can order transfer of all calls to the number at any different location. To this end, he dials 969, and the number for transfers. The transfers, however, are only possible between seven-digit numbers.

The computer also helps with the dialing of most frequent numbers. One dials 9661 and then number you want to reach. In the future it will be sufficient to just dial 961. In the same way, one can arrange for long-distance conversations without having to dial the city and local numbers each time.

This is how modern telecommunications look in practice. The services, however, are expensive. The transfer of numbers and their "abbreviation" must be ordered for the entire month by a letter to the Provincial

Telecommunications Office. Each "transfer" or "abbreviation" costs 100 zlotys per month. Computer wake-up service is the cheapest--just two zlotys.

9922
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COMPUTER DILEMMA, R-34 COMPUTER DEVELOPMENT REPORTED

Warsaw PRZEGLAD TECHNICZNY in Polish No 30, 22 Jul 84 pp 16-18

[Article by Ewa Mankiewicz-Cudny and Roman Dawidson: "Who Likes Computers"]

[Text] Experts have evaluated that until the late 1990's electronics will increase its capability. They foresee about 25,000 new applications. Demand for equipment and services that make use of new electronic solutions has been steadily growing. In the early 1970's, electronics underwent a revolution brought about by the invention of microchips and subsequent design of semiconductor memories. These developments have enlarged the scope of computer applications, reducing computer size and production costs. Currently, the pace and trends of development of industrialized nations depend on microelectronics.

Beginnings and Development

When we tried to determine the birthdate of the Polish computer industry, we found out that Polish computer engineers not only differ in the definition of development trends but also in dating its beginnings. Some see the starting point as the introduction of the ZAM-40, a brand name now forgotten. Others trace computer history in Poland from the Odra 1300 series, while still others begin their count from the creation of the Association of Automatics and Measurement Equipment, or Mera. Leaving this debate to future historians, we will briefly remember what was happening in this industry over the past 15 years. Until that time, computer industry in Poland and other socialist countries was developing independently. Each tried to catch up in its own way. According to experts, in the countries now participating in the Unified System, about 80 types of different computers were used, each with a separate software, and about 30 types of different peripheral devices. In this situation it was practically impossible to organize cooperation. This was a result of a lack of an overall concept and division of functions in this area among CEMA member nations. In the summer of 1968, the USSR and Poland advanced the initiative for setting up close cooperative links in research, development and production in the

advance of manufacturing and application of third generation digital computers among CEMA member nations. In the third quarter of 1968, the socialist countries interested in that initiative organized a cooperative endeavor, and in December 1969 signed an international agreement on developing, production and application of computer technology. The first signatories were the USSR, GDR, Czechoslovakia, Bulgaria, Hungary and Poland. This is how Ryad was born.

Under the egis of the Unified System, Poland's task was to develop and produce the R-32 computer system with a working memory of 1 MB and software for remote data processing; a two-machine combination of R-32 computer with the basic software for functioning in conditions of strictest reliability requirements; communications process for the Unified System; a system for remote and local CRT monitors of the Mera 7900 type compatible with the R-32; and a system of data preparation Mera 9150. The most popular products, however, are line and dot printers. After cooperation in development of small computer systems was expanded, Poland undertook the production of: an SM-3 minicomputer system based on Soviet processors; a configuration of SM-3 with Camac; subsystems for data collection for industrial control devices; minicomputer systems Mera 100 and Mera 200, Mera 60 and Mera 80; and further development of screen monitors (Mera 7952 and Mera 7954). At the same time, we began to produce small tape memory unit PT-305, cassette memory PK-1, floppy disk PLX-450 and so-called stations of paper tape preparation. Simultaneously, in the 1970's we developed and brought into production the Mera-300 and Mera-400 minicomputer systems.

Unfortunately, in many cases the outputs were insufficient and failed to meet the demand, even though between 1965 and 1975 the total output increased tenfold.

When in the early 1970's we decided in Poland to catch up with the world industrial level, the task seemed easy. Modern economy calls for up-to-date technology, both in management and production. This implies dynamic development of the manufacturing of computer equipment. At that point, also, the debate about the main trend of development of electronic industry and the possibilities of application of its products was started, which has not been resolved even today.

At the beginning it seemed that just installing a computer at a factory would by itself improve the organization of production and improve product quality. It was soon clear that computers cannot "write" favorable reports or obtain scarce materials. On top of that, computers often prove mischievous and fail to show due respect for the hard work of factory managers by revealing the organizational shortcomings.

To be fair to factory managers, it must be said that in many cases the computers were installed not because there was a real need at the enterprise but solely because it was required by fashion. If one wanted to be modern and have modern production, a computer was a must. Computer factories that were members of the Mera association at the time worked under

tremendous pressure. There was a long waiting list for computers. There were also shortages of peripheral equipment such as printers (even though their output had been increased), as well as memory units. Actually, this situation has not changed even to the present. Furthermore, computer owners are made wise by experience with failures of component elements of computer systems and now try to ensure continuous operation by hoarding more computers than they actually need.

How Is It Today?

Between 1976 and 1982, user demand has been declining. Polish equipment was too expensive, and there was less and less money to purchase it. A lack of software, spare components, poor training of users and unreliability of certain kinds of equipment, especially minicomputers of the Mera-300 series, resulted in a drop in interest in computerization.

In 1976, users placed orders for 125 computer systems and 300 minicomputers. At that time, industry produced 102 computers, of which 100 remained in Poland. An additional 21 units were purchased abroad. Altogether, 350 minicomputers were produced, by far in excess of domestic orders. In 1980, only 78 orders for computers and 460 minicomputers were placed.

Polish industry was capable of turning out just 27 mainframe computers (five of which were exported). We purchased abroad eight systems. Also, 198 minicomputers were produced, but even with another 44 units purchased abroad this failed to meet domestic demand. Despite a drop in the number of those willing to buy a computer, our industry, supported by limited imports, was unable to meet local demand. In 1982, we had to rely completely on domestic production, which has been steadily declining. In that year, 17 computers were made (including two for export) and 132 minicomputers, of which only 39 could remain in Poland.

Last year, although according to the management of the Association of Producers of Information, Automation and Measurement Equipment it was an improvement over 1982, could be hardly called successful. Difficulties with purchases of materials and components were still observed. Practically nothing was imported from capitalist countries. This, of course, had its reflection on the manufacturing of equipment which largely depends on import of parts and subassemblies from Western firms.

One can even ask the question whether it is legitimate at all to speak of a Polish computer industry if the nation's largest enterprise, the Wroclaw Elwro, in 1983 produced just eight Odra-1305 computers (one for export) and five R-32 units (one for export). As to minicomputers, the Warsaw Era factory produced 41 units of the Mera-400 and 98 units of the SM-4A.

Obviously, these enterprises produce other computer equipment which ensures their profits and jobs for their employees. In addition to economic difficulties, however, there are voices stressing the need for automation in Poland. Unfortunately, again, many of the wishes begin with such words

as "It is desirable ... ," "It is necessary ... " etc. Most of these requirements, however, are a far cry from our reality. Here one can ask another question: Is it possible to speak of a real computer industry without development of an industry that would produce components and materials necessary for electronics?

At the press conference before the fair organized by the association in June, its management and representatives of individual factories offered new designs and described their capabilities. The new concepts that will come to the market two or three years later, such as the D-180 dot printer (a modernized version with a built-in microprocessor), and the printers D-100, D-200 and DW-401 produced by Mera Blonie, are examples of such designs. We never doubted the talents of Polish engineers, so the information on advanced projects such as tape printer D-500 with Soviet K-1804 microprocessor and laser-xerographic printer (from the Institute of Mathematical Machines) linked to the M240R minisystem were not surprising. Other factories, associations and institutes came up with similar offerings and produced extensive information on new memory disks, mechanized memory devices, monitors, etc.

We, however, are still concerned with question of whether all that can be described as a computer industry. Let us go further and ask the next question: Is Poland capable at all of developing such an industry? What are the quantities of products and their level that can be offered? The time has arrived to make a choice in determining the future trends of development. We say that no modern civilization can do without computers--which is true. But producing less than 100 computers and not the latest generation models--does this determine Poland's road to civilization?

We understand the viewpoint of Elwro engineers who claim that we can do it. We believe that they can develop, design and manufacture several units of modern machines, provided that high-quality subassemblies and components are available. Even if they do not receive such components, they will find a way and build a prototype. However, what will come out of it, and what good is it to the economy in general?

People at Elwro say that currently the demand for computers in our economy is low. Users, however, say that equipment is too expensive. If that is true, then perhaps Elwro must switch to different kinds of electronic products which are no less necessary, such as personal microcomputers (provided the components are available). But several mainframe computers could simply be purchased from neighboring countries. Demand for microcomputers will certainly grow, as was seen at the exhibition of Polish Science 56 MTP.

Poland specializes in production of printers. We must find more capabilities and invest only in these areas. No country produces everything, except for major superpowers (and even they not always have everything produced at home). We must understand that further development of the computer industry in the coming few years will be limited by available funds

and the restrictions for purchase of components abroad and outside of CEMA nations. We must also remember that in 1982 there were 809 mainframe computers and 1724 microcomputers in Poland, including: E-Odra-1305, 280; R-32, 107; Mera-305, 331 and Mera-400, 237. More than 60 percent of machines have been working for over six years, and about 55 percent of minicomputers for from four to eight years.

The economic reforms have reduced the demand for complete systems. On the other hand, there arose large demands for equipment needed to expand or modernize the existing computer systems. This demand has not been satisfied. This mainly concerns the development of systems for remote data processing. Polish users need working memories, line printers, communication processors, screen monitors and terminals using dot printers.

Our computer industry, trying to survive, has taken the orientation for exportation, which is logical from the industry's point of view. From year to year, the share of exports in the total value produced has been growing, and supplies to the domestic market have been declining. In addition, the central plan makes this industry responsible for supply of basic software and services, as well as hardware. Despite the organizational efforts currently undertaken by producers, the situation leaves much to be desired. The shortage of proper hardware components and subassemblies and the growing number of systems in operation result in increasing idle time. There are complaints of high failure rates of Polish computers. In 1982, 8 percent of working time of mainframe computers and 17 percent of microcomputer time were wasted on emergencies. In addition, there is a shortage of paper for printers, and the poor quality of Polish paper tape, a shortage of ink tapes, and shortage of currency for the purchase of magnetic tape and magnetic disks, packages, air conditioner devices, etc.--all these contribute to the gloomy picture of the Polish computer industry as viewed by the user. The shortcomings of the component supply base and limited series of equipment that are not distributed abroad result in a huge rise of costs, despite the simultaneous deterioriation of hardware quality. These are the problems which have to be struggled with most often. Some hopes are now given by the Decision of the Council of Ministers 77/83, issued in June of 1983, concerning the introduction of electronics into the national economy.

Future Plans

The producers believe that they will be able to reconcile the necessity of export (which guarantees long production series and profability) with the needs of the domestic market. The above-mentioned decree creates this possibility through economic mechanisms allowing accumulation of capital. The plan is to use this capital to increase the list of products and variety of equipment. Our producers promise that in the coming years the output of small-sized printers will attain the figure 20,000 (in 1986), that of various types of monitors 15,000 and disk memories 5,000 units. The output of specialized minicomputers of the SM family will be brought up to 500 units. At the same time, remote data processing

attachments to SM minicomputers will be brought into production. The output of floppy disks will be increased, and the production of five-inch disks will be started. Elwro reports that the remote data processing systems will become a Polish specialty in the CEMA framework, and the best chance for further development of production for Wroclaw producers of the Odra computers. But all these investments and modernization plans will not be sufficient to meet domestic demand. This is the sad truth, so that imports will still be necessary. Without them, it is impossible to speak of exports. We cannot expect that only others will be buying from us. We also have to buy products from others.

It seems that one way to meet domestic demand is developing small software firms that would supplement the existing enterprises and work both to modernize the existing hardware facilities and to produce programming. The contribution of these firms, especially in software development, will be extremely valuable. This is a key to the future of automation in the national economy. Poland is definitely behind in computer applications to engineering and research and to control of industrial processes. This is illustrated by the table.

The problem of application of computers for automation of professional work and engineering processes requires a special discussion. Such applications yield the best effects for the economy. Progress in this area is obstructed by the following: limited capacity for innovation in the industry (the long time for results to become effective), inadequate programming, an absence of projects of adequate production organization systems and the continued poor training of managerial and engineering staff in computer and information science. That is another problem that has to be tackled in the near future.

Table 1. Structure of Computer Operation Time

	Computer Operation Time				Design and
Application	1979	1980	1981	1982	Programming
Total	100	100	100	100	100
Automation of industrial processors	18.1	16.7	16.7	14.3	4.8
Automation of professional work	16.1	17.1	17.1	18.6	20.1
Management	64.3	66.2	65.2	67.1	75.1

Computer Industry at the 56 MTP Fair

Before going to the Poznan Fair this year, we knew what we would see there from the above-mentioned press conference organized by the manufacturers.

The exhibition of the Polish computer industry was well prepared. It was linked to the 15th anniversary of the International Commission for Electronic Computer Technology and the 35th anniversary of the CEMA. Our computers were exhibited in a special pavilion marked with the big sign, "Polish Computer Industry," with a large number of micro- and minicomputers exhibited inside, where the young people could play with information equipment. There was no shortage of volunteers: boys from 12 to 100 years of age stood in thick crowds around blinking screens and pushed buttons, making the computers play more or less sophisticated games. This interest in computer technology among young people in a country where it is not yet accessible and advertised is encouraging and should give thought to people at the Ministry of Education, as well as computer manufacturers. Young people should get acquainted with this equipment as early as possible: first through games and later through education, to be able to use them in later life as a tool of their trade.

The main exhibit was a remote processing system based on the R-32 computer, with the remote data processor (EC-8371.01) produced by Elwro Enterprises. The system incorporates elements of standardized technical and programming units contributed by virtually all of the Polish manufacturers. This common exhibit is evidence that the industry is beginning to realize that isolation in this area is a negative phenomenon. It seems that the variety of possible configurations with remote data processing software will allow offering this products on the markets of our neighbors.

Elwro representatives who demonstrated the exhibit (regrettably, they could not offer any printed explanatory material) made no secret of the fact that the design has been built within the limits of Polish production capacities, but they also pointed out that it should meet users' demands. Obviously, they are proud of their results. The equipment operates as the main system controlling the process of transmission and ensuring two-way communication between the computer and its terminals (up to 350). In addition, the system has a multiplex modem, adapters and other peripheral devices.

The computer exhibition had a quiet graphical presentation which attracted attention amidst otherwise mottled colors. Regrettably, the equipment itself, particularly casings, was not color coordinated, and generally the finish leaves much to be desired.

What else have Polish computer factories presented at the exhibition?

Obviously, microcomputers--seven different types--and three types of minicomputers. The expected exhibit was an R-32 computer. Specialists will be interested in information on the preparation of a new computer system from Ryad (Unified System), the R-34.

A broad variety of magnetic memories were also presented. Tape and cassette, floppy and hard disks, etc., as well as input and output devices. A special group consisted of units preparing data on punched

tapes and paper and magnetic tapes, floppy magnetic disks and devices for data control and sorting.

Only the initiated were at the exhibit with semiconductor memories, heads and amplifiers.

An important, although not well-displayed, element of the exhibition was application software packages, systems for scientific research calculations and systems for automatic control of industrial processes and computer-aided engineering design. We will not list all the exhibits. The exhibition boasted a large variety of offerings, although frankly not all of them new. Currently, however, presenting the work of designers is not the most important thing. The fair should show what the industry, which can be called a computer industry only in anticipation, can produce to ensure continued operation and development of existing centers. The question of what computers and in what quantities should be produced requires serious discussion, which cannot go on forever, as has been the case until now, because decisions must be made quickly. The exhibition represents the existing activities.

It is time, however, to think about longer-term plans. These plans should stop the outflow of specialists and provide opportunities for modernization of computer centers, which is badly needed. The long-term plan must define government policy in information science and computers for at least 10 years. It must take into consideration the socioeconomic development of the nation and link it up with science and technology.

As we have mentioned, the economic reforms have reduced the industry demand for computer equipment. Simply, there was no longer the need to buy expensive equipment to interest the next visitor from the association headquarters or the ministry. There appeared a gap, because the mechanism that would force the factories in a natural way, based on cost-effectiveness analysis, to use computers has not yet developed. For the moment, a good accountant and diligent supplies manager seem sufficient. No one wants today the headache thinking of optimum production costs, market analysis simulation, etc. But maybe tomorrow ...

We must also be aware that without preparation of the public and introduction of informatics into school education we will be faced with another barrier. Even if Poland can overcome its current production difficulties, the unprepared public will be incapable of using this equipment. We don't think that halfway solutions will serve any purpose. Even today, we must decide what will be done in Poland and what should be imported. The introduction of electronics into the economy has to be accomplished sooner or later.

9922
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CONFERENCE ON STORAGE OF THERMAL ENERGY

Bucharest ENERGETICA in Romanian Jun 84 pp 284-285

[Article by Dr C. Staicu and Eng Al. Mihaila, ICEMENERG]

[Text] The Fourth Annual Conference on Thermal Energy Storage, organized by the Heat Storage Collective of the Laboratory for New Sources Conversion Technologies, was held on 21 February 1984 at ICEMENERG (Institute for Power Research and Modernization) in Bucharest.

It was attended by specialists from various research, design, and educational institutes with interests in this field.

The meeting was chaired by Dr Calin Mihaileanu, director general of the Central Institute for Energy Research. In his opening remarks, he indicated the importance of the topic and stressed the particular attention it receives in our country and abroad, the meeting being devoted to an examination of the problems raised by the construction of systems for heat storage in technical, heating, and hot water installations. He invited the participants to present brief communications regarding research results obtained during 1983, as well as future programs. In closing, he thanked those present for their attendance, and pointed out that the diversity of units represented at the meeting reflects the growing interest in heat storage problems.

The talks presented by specialists illustrated some aspects of the topic which justify this interest and a need for continued work. These were:

1. Research conducted at ICEMENERG (presented at the preceding conference) to store heat in molten salts, as ancillary equipment for the high-temperature thermodynamic cycle solar plant, is implemented by the formulation of a design project by the Institute for Energy Studies and Design (ISPE) (Eng Alexandru Mihaila, ICEMENERG).

2. The utilization of heat storage in diurnal cycles in heat production systems has good economic effects reflected in lower technical consumptions, reduced investments (smaller diameters for main conduits, smaller heat exchangers, and so on). In existing heat production systems, transportation capabilities are increased, peak power is reduced by 25 percent, and installation operations are more uniform (Eng A. Mihaila, ICEMENERG).

3. The implementation of storage installations in heat production systems, concurrent with heat storage in the network through higher transportation temperatures, makes it possible to increase heat transportation distances to about 100 km. This extremely important conclusion encourages the integration of CNE (nuclear power plants) in heat production systems (Eng Al. Mihaila, ICEMENERG, and Eng Mircea Voinea, ISPE).

4. Research is underway to build chemical heat pumps that use metal hydrides and hydrogen for long term storage of heat and hydrogen. This project is covered by a patented process, whose goal is to transport heat over long distances using hydrogen in its natural state or in the form of hydrides (Eng Al. Mihaila, ICEMENERG, and Eng Vasile Mecea, ITIM--Institute for Isotopic and Molecular Technology, Cluj-Napoca).

5. The storage of solar energy in natural or artificial lakes is under research in other countries. The first lake of this type was tested in Israel in 1959 for electric power production; it had a surface area of 7500 sq-meters and supplied a 150-kW turbogenerator. The use of the Dead Sea for this purpose is also planned. Similar concerns exists in FRG (in the hope of saving about 50 million tons of oil per year) and in England (Dr Constantin Staicu, ICEMENERG). In Romania, the Geographical Institute (IG) has started collecting information about natural lakes for solar heat storage (Dr Petre Gistescu, IG).

Inception of research in this area, and the formulation of a coordinating work program appears necessary.

6. A current technical-economic problem is to improve thermal insulation in constructions, in parallel with heat storage (Dr Liviu Dumitrescu, ICCPDC Central Institute for Construction Research, Design, and Direction, and Eng Tutuianu Ovidiu, MEE--Ministry of Electric Power).

The use of infrared thermography appears as a modern and efficient method for obtaining optimum insulation measurements (Prof N. Leonachescu, ICB--Institute for Concrete Constructions).

7. Heat storage in concrete reservoirs is a current project being researched at IPCT (Design Institute for Model Constructions), using cylindrical tanks of 2500, 5000, 10,000, and 20,000 cubic meters with an L/D (length/diameter) ratio of 0.2:0.3 (the maximum height of the tanks being 10 meters). These tanks will be insulated on the bottom and along the sides. Also being studied are 10,000, 20,000, and 50,000 cubic meter pools, their advantage being that they are much less expensive. The heat source will the sun and recovered residual heat. The investment recovery time has been calculated at 14-18 years for solar energy storage, and at 4-5 years for residual heat storage. Heat exchange between the tank and the environment has also been examined. The behavior of concrete under heat remains an open problem for research (Eng Berbecaru Dan, IPCT).

The shape of the reservoirs was determined from optimization calculations; the most economical are spherical, cylindrical, or cubic shapes (Prof N. Leonachescu, ICB).

8. Heat storage in the ground, in vertical wells or horizontal coils seems to be another possibility in our country (Eng R. Cristea, ICH--Enterprise for Hydroelectric Power Constructions).

9. The transition to practical applications is determined by the completion of research and the delivery of solutions to designers, who in the light of general measures for hydrocarbon savings, reduced specific consumptions, and improved control of heat production systems, must select the optimum ones from a technical and economic standpoint (Eng D. Rentea, ISPE, Eng Ion Ionescu, ISPE, and Eng M. Voinea, ISPE).

In closing the meeting, Eng Al. Mihaila acknowledged the usefulness of the conference in establishing an exchange of experiences, and the possibility of correlating research activities in this field in the future.

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